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February 2012

Introduction to Staying Ahead of the *Gathering Storm*

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The health and prosperity of the United States in the 21st century will depend on several factors, but one important factor will be our ability to attract and educate new generations of world-class scientists, technologists, engineers, mathematicians, and medical (STEMM) professionals and support personnel.¹ Building on Friedman's metaphor of a flat world, the National Academies have warned that we must make a national commitment to "rise above the gathering storm" (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2005). To ensure the competitiveness of the United States in the decades ahead, the *Gathering Storm* Committee recommended a series of changes in education, science and technology policy, tax laws, and science funding. The committee assigned high priority to improving the quality of public school science and mathematics education in the United States and to increasing the number of students prepared to earn undergraduate and graduate degrees in science, engineering, and mathematics. Based on the committee's findings, Congress approved the America COMPETES Act 2 years later with bipartisan support.

In a 5-year follow-up assessment, the authors of the original report concluded,

The recommendations made five years ago, the highest priority of which was strengthening the public school system and investing in basic scientific research, appears to be as appropriate today as then. The *Gathering Storm* Committee's overall conclusion is that in spite of the efforts in government and the private sector, the outlook for America to compete for quality jobs has further deteriorated in the past five years. The *Gathering Storm* appears to be a Category 5. (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2010, p. 5)

The purpose of this set of articles is to focus on the attitudes, dreams, plans, and progress of young Americans—primarily from Generation X. We also examine the factors that have allowed some of these young Americans to enter a STEMM profession or support occupation and to identify the barriers to entry for others. The national debates about rising above the "gathering

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¹Miller and Solberg provide a more detailed discussion of the composition of the scientific and technical workforce later in this issue, but it is important to note that this designation incorporates all of the broad fields normally included under the STEM umbrella and adds an additional M to denote the inclusion of medicine and other health professions and support occupations.

storm” often focus on aggregate numbers of students enrolled in selected programs and the number of graduates in specific fields. These are important data, but they are summary numbers that reflect millions of individual decisions by students and parents about the desirability of STEMM employment, the courses to take in middle school and high school, the college to attend and the major field(s) to pursue, and financial and life course decisions about graduate or professional study. It is important to examine the literature and available data to learn more about the nature of these decisions and the factors that influence them.

The work included in this issue of the *Peabody Journal of Education* reflects the convergence of two major longitudinal studies by Benbow and Lubinski and by Miller. In December 2009, Benbow and Miller made presentations to the National Research Council’s Board on Science Education that summarized the relevant findings from Benbow/Lubinski’s Study of Mathematically Precocious Youth (SMPY) and Miller’s Longitudinal Study of American Youth (LSAY). Benbow and Lubinski’s sample of high-achieving students in mathematics and Miller’s national probability sample of public school students provided complementary portraits of the education of future STEMM professionals. A subsequent symposium on pathways to STEMM careers at the 2010 annual meeting of the American Association for the Advancement of Science then brought together five major papers based on LSAY data that explored the factors associated with entrance into scientific, engineering, and biomedical careers at the professional level. Building on this body of work, the editors of this issue identified additional areas in need of further exploration and invited two additional papers to fill those gaps. We believe the resulting set of analyses provides a coherent overview of the development of individual interest in and pathways into STEMM professions.

A GENERAL FRAMEWORK FOR THINKING ABOUT STEMM CAREERS

As a preface to the analyses and articles included in this issue, it is useful to suggest a general framework for thinking about both professional and supporting STEMM careers. Both of the issue’s editors have worked in the field for a number of years, and the process of editing and thinking about these analyses reminded us of some general conclusions that we have reached that help to frame these issues.

Our first conclusion is that the conceptual definition of the scientific and technical workforce must include science, engineering, medicine, and related health professions. At the professional level, it is increasingly impossible to differentiate between laboratory biomedical science and clinical biomedical science. Along with clinical medical school faculty, research faculty in biology departments study cell receptors and stem cells. Many practicing physicians combine patient care with participation in the clinical trials of new pharmaceuticals. Distinguishing STEM professionals from biomedical professionals can be harmful when trying to examine the career thinking of middle school and high school students who think that they are interested in “medicine” but who have a minimal understanding of the roles of microbiologists, physiologists, geneticists, and other biomedical professions in the conduct of research or the provision of professional services. Because of this, we find the broader STEMM designation to be useful and appropriate.

Second, the processes by which individuals develop an interest in a STEMM field and begin to think about it as a potential occupation or profession are numerous and diverse. There is no single pathway to a STEMM profession, although some pathways are travelled more often than others. The work of parents, relatives, or even neighbors can push young people toward a STEMM

field, whereas others may never have the opportunity to interact with a STEMM professional. Teachers, television shows, information obtained by reading, and even talking to other students can also influence young peoples' decisions. Rarely is an individual decisively influenced by one individual or one event. More typically, a combination of influences converges over time.

Our third conclusion is that the development of career choices by most young adults appears to be the result of a series of explorations and experiences rather than a single event or a constrained set of events. Many middle school students have a reasonably firm expectation about the level of education that they expect to obtain and, when asked about potential career choices, they often mention occupations and professions that are generally congruent with their educational expectations. The degree of clarity of educational expectations and the level of certainty associated with educational and occupational choices varies significantly among students, and students from better educated households are more likely to hold more developed sets of plans and expectations. But even among the most prepared eighth or ninth graders, there is still a process of trying, testing, exploring, and often modifying earlier expectations. One of the advantages of using longitudinal data sets to explore these questions is that repeated measures of the same student over a period of years provide a more accurate picture of these explorations and modifications than is possible in any cross-sectional analysis.

Fourth, the factors involved in these decisions are a combination of family, personal, school, and external influences that interact in complex ways. Studies that focus exclusively on school or curricular factors (and demographic factors such as gender and race) are limited and inadequate, just as studies based primarily on social class or community characteristics are equally inadequate. In all of the work reported in this issue and in the growing literature based on the analysis of longitudinal data, including that of Benbow/Lubinski, we have found that parental, school, social, cultural, media, and life-course factors all interact in a complex manner. These patterns dictate the use of multivariate analysis methods that take into account the nature and structure of background factors, recent experiences, current experiences, and future hopes and expectations. Several of these analyses employ structural equation models to examine structure and change over periods of years.

Finally, it is critical to recognize that understanding the STEMM field is like shooting at a moving target. The sciences and technologies on which STEMM careers are based are in a period of extraordinary growth. The expansion of science and technology in all disciplines has produced a continual redefinition of current jobs and the continual creation of new occupations that could not have been imagined two decades ago. The venerable Dictionary of Occupational Titles has since ceased publication because its authors could not update and print the journal as fast as the occupations contained within changed. The Department of Commerce has moved to a new online O-net system that seeks to integrate new jobs and tasks into a broad classification scheme on a continuous basis. This reflects the rapidly changing nature and structure of the STEMM workforce. For the individual, standing still is not an option. Students and young adults must make a series of career-relevant decisions based on their best understanding of current occupational choices and likely patterns of development. Inevitably, this produces a longer and more complex set of explorations, experiments, and midcourse corrections than may have occurred in previous generations.

We find these framework generalizations to be useful in thinking about the issues in our own analyses and in reading and assessing the literature in this field. We hope that the readers of this issue will find these ideas to be helpful in thinking about the analyses and articles that follow.

THE PLAN FOR THIS ISSUE

We begin this issue with a definitional article by Miller and Solberg making a case for the differentiation of STEMM professional careers and STEMM support careers. Too often, studies of STEMM careers have grouped professional and support occupations into a generalized scientific and technical workforce, but a careful examination of the careers included in this generalized bundle suggests that the education and skill sets needed vary substantially between professional and support jobs. As such, the continued grouping of these careers is detrimental to the development of a clear understanding of the pathways into those careers.

In an exploration of the question of how the United States can nurture future STEMM innovators, Benbow discusses the twin issues of talent identification and talent development using the research conducted by the SMPY. SMPY's longitudinal data yield useful insights into the processes by which schools translate early talent into later educational attainment and career choices. These choices are the result of many influences, including both educational experiences and personal characteristics. Attention to spatial ability throws additional light onto the question of whether there are untapped pools of future innovators.

Using LSAY data, Miller and Kimmel examine pathways into STEMM professions collectively (including science, engineering, mathematics, medicine, and the health professions). Using a set of structural equation models, Miller and Kimmel explore the impact of family, school, peer, and life-course influences on successful entrance into a STEMM profession during the first two decades after high school. This article also introduces the LSAY data set, which are used in several subsequent analyses.

Pearson and Miller focus on pathways into professional engineering careers. Engineers represent the largest single component of the STEMM professional workforce, and it is important to explore the factors associated with a successful entry into an engineering program.

Fuchs and Miller focus on pathways into professional biomedical careers. Some of the literature and many career counselors in high schools see the skills and academic preparation of biomedical professionals as distinctively different from the preparation of scientists or engineers. Fuchs and Miller examine commonalities and differences in pathways to professional biomedical careers in comparison with other STEMM professions.

Solberg, Kimmel, and Miller examine the pathways to STEMM support careers, differentiating pathways to health and biomedical support careers and other STEMM support careers. As noted earlier, this has been a neglected area of research and has been combined with analyses of entrance into the STEMM professions to the detriment of both. Using data from the LSAY and a set of structural equation model analyses, this article explores the factors that predict interest in and entrance into a support career. The authors suggest some interesting findings and outline several areas of research in need of further study.

Although young women enter college at a higher rate than young men and select STEMM majors as often as young men, they are less likely to be employed as a STEMM professional 20 years after high school than are young men. Kimmel, Miller, and Eccles use LSAY data to identify the major factors associated with this result.

Numerous studies have found that students from non-college-educated homes are less likely to develop an interest in a STEMM field and are markedly less likely to enter a STEMM profession. Using LSAY data, Miller and Pearson look at the factors that drive this differential and suggest additional research that might lead to interventions to address this problem.

Multiple analyses based on the LSAY and other studies have found that mathematics is often a major barrier to the pursuit of advanced study in a STEMM field or profession. Schmidt addresses the current state of precollege mathematics education in the United States and suggests some policy choices to address this problem.

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The Composition of the STEMM Workforce: Rationale for Differentiating STEMM Professional and STEMM Support Careers

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This article argues for the need to differentiate between *professional* and *support* careers in fields of science, technology, engineering, mathematics, and medicine (STEMM). Using data from the Longitudinal Study of American Youth (LSAY), the article identifies important differences in the nature of the work and responsibility that differentiate the scientific workforce into a professional component and a support component. Further analysis demonstrates that the kind of training and education needed for STEMM support occupations is generally lower and different than the education needed for entrance into a STEMM profession. The LSAY data indicate that the students planning to enter a STEMM profession tend to make their choice earlier, select appropriate courses and programs to obtain professional credentials, and make a substantially longer commitment to educational preparation than do young adults who enter STEMM support occupations. We suggest some policy implications that may flow from this distinction.

There is genuine national concern about the size, composition, and future of the scientific workforce (Anselmo, 2007; Bulletin of the American Meteorological Society, 2002; King, 2007; Mabrouk, 1998). With the publication of *Rising Above the Gathering Storm*, the National Academies (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2005, 2010) described the consequences of losing our national leadership in science and engineering. They argued for placing a higher priority on improving the undergraduate and graduate talent pool for science and engineering by improving precollege science and mathematics education. In this introductory article, we examine the composition of the scientific workforce and argue that the occupations that fall under the broad umbrella of the scientific workforce tend to cluster into two distinct groups. One group can be characterized as professionals in science, technology, engineering, mathematics, and medicine (STEMM). Individuals engaged in these professions tend to have advanced education, substantial independence in their work, and responsibility for the supervision of other more technical occupations. The second group includes an

equal number of workers who have some scientific or technical education but who generally work under the supervision of a professional and who rarely define the tasks that they perform. As we discuss later in this article, there are some jobs that fall in between these ends of the spectrum. We outline our rationale for the assignment of those occupations to a professional or support classification.

THE STEMM PROFESSIONS

There is broad agreement that the STEMM professions consist of a broad cluster of professional jobs based in science, technology, medicine, engineering, and math. In many traditional scientific disciplines, university-based scientists are expected to have a doctorate and to develop an independent research program. New university science faculty members are expected to have a doctoral degree and, increasingly, some years of postdoctoral work under the supervision of a more senior scientist. The requirements are sometimes less rigorous for scientists employed in industry and government, but there is a strong expectation of advanced training that runs through all of these professions. A similar pattern holds for careers in medicine and other health professions. Although there are a few programs that seek to reduce the combined time for undergraduate and professional schooling, the dominant pattern still requires 4 years of baccalaureate study, 4 years of professional school, and several years in a medical residency. Reflecting the convergence of basic science and clinical fields, there is a growing number of joint M.D. and Ph.D. programs in the United States that provide the breadth of skills necessary for modern biomedical research.

The baccalaureate is still the modal degree for entry into an engineering career, but an increasing number of students indicate an expectation to continue into graduate study, often with support from an employer (Duderstadt, 2008; National Academy of Engineering, 2004, 2005). Many employers make clear their preference for new engineers with graduate training.

In mathematics, a doctorate is widely expected for both university and nonuniversity professional appointments. The same expectations apply to professional statisticians.

Outside of engineering, most jobs that qualify as professional in nature require some level of graduate or professional training. In health and medicine, there are numerous therapists and other specialists who need at least a master's degree and who work independently in the provision of medical or health services. In many environmental science agencies and organizations, leadership positions require a master's degree and the occupants of these positions tend to operate with substantial independence. The number and types of these jobs have been growing in recent decades and will undoubtedly continue to grow in the decades ahead.

All of these jobs—from university professors to corporate laboratory directors to environmental protection administrators and regulators—are widely viewed as professional in nature and as requiring appropriate professional training and preparation. These, however, are not the only jobs in the STEMM classification. Although many of the national reports on the scientific workforce have tacitly assumed that the field is composed entirely of professionals, we have found many jobs and occupations that are important to science and technology which have not met the criteria that we and others associate with a professional position. Thus, we turn to the other half of the scientific workforce.

STEMM Support Occupations

As almost all STEMM professionals know, other individuals with specialized training and skills perform much of the day-to-day work in the laboratories or on the research teams of STEMM professionals. Many of these positions are well known. Skilled technicians and technologists perform a substantial portion of day-to-day bench science, and no laboratory would operate for long without these valued staff members. Laboratories and engineering firms depend on large numbers of skilled workers who build apparatus, repair equipment, and program computers and other devices. A physician may be the quarterback of a health care team, but there are many nurses, therapists, and technicians who provide much of the hands-on care in clinics and hospitals. The growth of information and communication technologies has produced an increasing number of information technology specialists, ranging from IT workers that install and maintain networks to webmasters that build and update websites.

Many of these STEMM support occupations are readily recognizable, and there is broad acceptance of their role and importance to scientific enterprise. Compared to STEMM professions, STEMM support occupations tend to emerge in response to new technologies and to change in content and title as technologies and roles evolve. A quick reading of almost any community college catalogue or course-offering brochure will illustrate the mushrooming number of STEMM support occupations.

Most STEMM support occupations require less formal education than a STEMM profession, but in making this distinction we do not mean to minimize the value to or role in the scientific enterprise. We concur with John Gardner's (1961) assertion 50 years ago:

We must learn to honor excellence in every socially accepted human activity, however humble the activity, and to scorn shoddiness, however exalted the activity. An excellent plumber is infinitely more admirable than an incompetent philosopher. The society that scorns excellence in plumbing because plumbing is a humble activity and tolerates shoddiness in philosophy because it is an exalted activity will have neither good plumbing nor good philosophy. Neither its pipes nor its theories will hold water. (p. 86)

Some Definitional and Boundary Issues

There is broad agreement on the definition of most of the occupations that we classify as a STEMM profession or a STEMM support occupation. At least 90% of relevant occupations can be classified in the two-group structure without dispute or controversy, but several clusters are more difficult to resolve, and we turn to a brief discussion of these areas to illustrate the boundary issues inherent in this dichotomous classification.

Nurses and Nursing

The role of nursing in the health professions has been emerging over the last 50 years. The hospital-based schools of nursing that educated the majority of the nation's nurses for the first

half of the 20th century are now nearly extinct, and almost all new nurses complete an associate degree or a baccalaureate. Many nursing roles now require a master's degree, and directors of nursing in hospitals often have a doctorate. The roles that nurses play in biomedical research and in the delivery of medical and health services have grown as the education and skills of nurses have expanded. Ideally, the differentiation between a nurse who is a STEMM professional and a nurse who is a STEMM support person should be based on more detailed information about the actual roles that they perform in their work, but this kind of functional information is rarely available for analysis. Recognizing the arbitrary nature of these classification decisions, the LSAY defines nurses with a graduate degree (master's or doctorate) as STEMM professionals and nurses with an associate or baccalaureate as STEMM support workers. Nurses who have qualified as a physician assistant (as defined by applicable state laws and regulations) are classified as STEMM professionals.

Mathematics in the Service of Business

Individuals with a doctorate in mathematics who are a part of a university faculty are classified as STEMM professionals, but is an individual with an earned doctorate in mathematics who is employed full-time by a hedge fund a part of the scientific workforce? Does an individual with a graduate degree in mathematics who is employed as an actuary in an insurance company qualify as a STEMM professional? Does an individual with a master's degree in statistics who is employed in the marketing department of a food company qualify as a STEMM support worker? These examples illustrate the problems inherent in linking STEMM membership to degrees, but disassociating STEMM membership from degree qualifications would create even more difficult issues. In this case, the LSAY has coded all three jobs just described as non-STEMM because the work was not related to science, technology, engineering, or health.

STEMM Support in Science and Technology

The third major area of ambiguity concerns a range of occupations that have some connection to STEMM but are difficult to classify as participating in a STEMM support career. In scientific laboratories and research centers, there are a variety of support occupations. The STEMM classification approach categorizes these laboratory technicians, programmers and information network technicians, draftsmen, glass blowers, and specialized repair staff (e.g., individuals who service electron microscopes) as STEMM support occupations. The line becomes less clear for electricians who may install or repair wiring for a scientific laboratory but who also perform electrical work for other institutional functions (e.g., general administration or food service). We have less difficulty excluding clerical staff who work in a scientific laboratory or research center from the STEMM support classification because their skills are general and not inherently related to science or technology. Recognizing the inherently arbitrary nature of classification decisions at the margin, the LSAY excludes general craft categories from the STEMM support classification but includes crafts that are closely linked to scientific or technical activities.

Science and Mathematics Teachers and Instructors

The inclusion of regular university faculty in science and mathematics as STEMM professionals conforms to broad understandings of the meaning of science and engineering professionals, but the issue becomes less clear in lower levels of science, mathematics, and engineering instruction. Is a high school chemistry teacher a STEMM professional or a STEMM support occupation? Is a community college biology instructor a STEMM professional or a STEMM support worker? These are not easy questions. The individuals who perform these jobs are important influences on future scientists and engineers, and there is an abundance of stories of the critical influence played by teachers in the early development of scientific careers. Unlike a number of state governors and legislators who have overtly sought to demean and devalue teachers, we do not want our classifications to fuel any disrespect for precollege teachers.

On balance, the LSAY classifies precollege science and mathematics teachers as STEMM support occupations and postsecondary science, mathematics, and engineering faculty as STEMM professionals. Our primary discomfort in this classification is the role of community college science, mathematics, and technology faculty. The literature suggests that some community college science and mathematics courses are more like high school courses than college courses, but there has been a strong emphasis on the improvement of the quality and rigor of community college instruction, and these courses are almost universally accepted as transfer credit by senior universities. In fact, many community college courses become the basic courses on which more advanced undergraduate courses are built, and millions of students continue to pass through that sequence of science and mathematics learning.

The Size and Composition of the STEMM Professional and Support Workforces

Using these broad definitions, the LSAY classified 7% of young adults as entering a STEMM profession within the first 20 years after leaving high school and 6% of young adults as entering a STEMM support occupation (see Table 1). One third of STEMM professionals are engineers, and .5% are professional scientists. Three percent are physicians or other health professionals. These general proportions are consistent with Census and other workforce estimations in the United States.

Within the general classification of STEMM support workers, it is useful to distinguish between STEMM support occupations related to health and medicine and STEMM support occupations involving other kinds of science and technology. Today, 3.3% of LSAY young adults are employed in a STEMM support occupation related to health, and 2.7% of LSAY young adults are employed in STEMM support jobs that are related to other science and technology activities (see Table 1).

The Educational Logic for the STEMM Professional and Support Classifications

The logic for the division of the scientific workforce into STEMM professionals and STEMM support workers rests on a combination of (a) the nature of the work and responsibilities for the two clusters of jobs, and (b) the educational qualifications associated with each job cluster. Most of the preceding discussion has focused on the nature of the work and the responsibilities of

TABLE 1
STEMM Employment and Level of Education of LSAY Young Adults

	% of All Young Adults	Level of Education					
		LT HS	HS	AA-AS	BA-BS	MA-MS	PhD/Pro
STEMM professions ^a	7.0	0%	0%	0%	35%	33%	32%
Scientists	.6	0	0	0	0	33	67
Engineers	1.8	0	0	0	57	40	3
Medical professionals	2.9	0	0	0	3	36	61
Other STEMM professionals	1.6	0	0	0	80	20	0
STEMM support ^a	6.0	0	24	29	36	11	0
Health support workers	3.3	0	16	37	41	6	0
Sci-tec support workers	2.7	0	34	19	28	19	0
Non-STEMM	68.9	3	51	6	25	12	3
Out of workforce/No response	18.1	7	54	7	26	4	2
All LSAY respondents	100.0	3	46	8	27	12	4
N	3,945						

Note. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; LT HS = less than high school.

^aExcludes social scientists. To adjust to include social scientists, add .2 to the STEMM total and .1 to the STEMM Support total and subtract .3 from the Non-STEMM line.

professionals for leadership, supervision, and a larger degree of independent work and judgment. But the two clusters vary significantly in the length and nature of academic preparation required for entry-level employment. These requirements, in turn, produce important differences to the time frame within which students must make certain course and program decisions. These factors combine to require students who want to become a STEMM professional to make a series of course decisions—especially in mathematics—as early as the middle school years and to engage in the serious study of math and related subjects throughout secondary school.

This combination of factors means that some students have disproportionately greater chances to understand and make the appropriate course choices and other students may be inadvertently excluded from the pathway toward a STEMM profession. This process has important policy implications for secondary and postsecondary education and for the resulting composition of the scientific professions. It is useful to look briefly at some data from the LSAY to understand the nature and magnitude of these differences.

STEMM professionals in science and medicine have graduate and professional degrees, and engineers are almost equally divided between those with a graduate degree and those with only a baccalaureate (see Table 1). Many of the STEMM professionals in this analysis have also completed postdoctoral training or medical residencies that may take several additional years. Apart from baccalaureate engineers, high school students contemplating a career as a STEMM professional face a decade or more of formal education before being able to enter their chosen profession. A decision to enter this path means deferring short-term income and may mean incurring various levels of debt from borrowing for postsecondary study. Some high school students may not have a clear understanding of the length of the pathway to a STEMM profession, but almost all of these young adults will become increasingly aware of the nature and length of

TABLE 2
Educational Qualifications for STEMM Professional and Support Workers

	All LSAY Participants	STEMM		
		Profession	Health Support	Sci-Tec Support
Highest level of education planned in high school				
Less than baccalaureate	33%	3%	23%	31%
Baccalaureate	29	27	30	31
Graduate or professional	38	70	47	38
Planned STEMM career in HS				
Non-STEMM	68	27	38	59
STEMM sci-tec support	7	3	6	15
STEMM health support	7	7	30	3
STEMM professional	18	63	26	23
Algebra track				
No algebra course in HS	11	0	4	3
Algebra I in Grades 10–12	28	4	26	22
Algebra I in Grade 9	48	58	63	60
Algebra I in Grade 8	13	38	7	15
Calculus in HS				
Took calculus in HS	10	43	4	17
HS science achievement quintiles				
Bottom 3 quintiles	54	16	50	37
Fourth quintile	23	21	32	31
Top quintile	23	63	18	32
HS math achievement quintiles				
Bottom 3 quintiles	54	13	53	31
Fourth quintile	23	25	30	41
Top quintile	23	62	17	28
N	3,945	273	131	106

Note. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; HS = high school.

their expected education early in their college years. For some young adults, this is an acceptable price to pay; for others it is not, and they may seek alternative careers.

The data from the LSAY support this view of the process. Of the LSAY young adults currently employed in a STEMM profession, 63% reported during their high school years that they intended to enter a STEMM profession, and 70% indicated that they planned to earn a graduate or professional degree (see Table 2). One in four LSAY young adults currently employed in a STEMM support occupation reported during high school that they expected to enter a STEMM profession, and slightly more than 40% of these young adults thought that they would eventually earn a graduate or professional degree. We look at the factors associated with eventual entrance into a STEMM profession or a STEMM support occupation in greater detail in subsequent articles in this issue, but it is necessary to note that nearly half of today's STEMM support workers originally aspired to a STEMM profession.

In addition to making an early decision to pursue (or to keep one's options open to pursue) a STEMM profession, students need to understand the course and program requirements necessary

to satisfy postgraduate programs. One of the earliest decision points is when to begin the study of algebra. Students who complete algebra in the eighth grade (or earlier) have a good chance to complete a calculus course during high school. High school calculus is a major gateway into postsecondary study in engineering and many scientific fields. Nearly 40% of LSAY young adults now employed in a STEMM profession took their first algebra course in eighth grade, and 43% completed a calculus course during high school (see Table 2). Conversely, only one in 10 of today's STEMM support workers started algebra in eighth grade, and more than 80% did not take calculus during high school. We recognize that school authorities often make the decision on who takes prealgebra in seventh grade and algebra in eighth grade with varying degrees of parental input. The decision is rarely a decision made solely by the student. Several analyses reported later in this issue examine the factors related to these early math course decisions, especially for students from noncollege households.

Approximately two thirds of LSAY young adults now employed as STEMM professionals scored in the top quintile in science achievement and mathematics achievement by the end of high school, suggesting that they had acquired a higher level of skill in these areas. Some of these scores may reflect different patterns and sequences of course taking, and some may reflect differences among schools.

A majority of the young adults now employed in STEMM support careers also performed well, scoring in the top two quintiles of math and science achievement by the end of high school, indicating that they were cognitively competitive in these areas. These results suggest that some of these young adults elected not to take the longer road for personal, family, or occupational reasons.

Policy Implications

The distinction between STEMM professions and STEMM support occupations has important implications for education policy and practice. Several additional analyses reported in this issue elaborate on the nature and implications of this distinction, but the preceding preliminary discussion points to a pair of general policy concerns.

First, it is clear that the very nature of professional and support jobs, as well as the levels of education necessary for entrance into these occupations, varies significantly. The continued lumping of these two kinds of jobs into undifferentiated discussions of the scientific workforce is inappropriate and may lead to misleading diagnoses and solutions. To stay ahead of the "gathering storm" (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2005), the United States will need to excel in the education of both STEMM professionals and STEMM support workers, but the pathways to these objectives are sufficiently different to require focused analyses and targeted solutions on both clusters.

Second, though the path to a STEMM profession has always been long, the general trend is that it is getting longer in almost all of the relevant STEMM professions. To some extent, the length of graduate and postdoctoral or residency training must reflect the breadth and complexity of the fields to be mastered, but the length of these pathways also tends to reward students from advantaged backgrounds and penalize students from disadvantaged backgrounds. Miller and Pearson, examine the magnitude of this disadvantage in a subsequent analysis included in this issue, but it is necessary to note that the lengthening of formal training works against the

encouragement of diversity in the STEMM professions (Heppner & Scott, 2004; Oakes, 1985, 1990; Whiston & Keller, 2004).

In the articles and analyses that follow in this issue, the pathways and the barriers to entering STEMM professions and STEMM support occupations are explored in greater depth. All of the analyses in the issue of the *Peabody Journal of Education* that utilize the data from the LSAY employ this dichotomized classification of STEMM careers. We think the results of these analyses will illustrate the value of this construction of STEMM careers.

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Identifying and Nurturing Future Innovators in Science, Technology, Engineering, and Mathematics: A Review of Findings From the Study of Mathematically Precocious Youth

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Calls to strengthen education in science, technology, engineering, and mathematics (STEM) are underscored by employment trends and the importance of STEM innovation for the economy. The Study of Mathematically Precocious Youth (SMPY) has been tracking over 5,000 talented individuals longitudinally for 40 years, throwing light on critical questions in talent identification and development in STEM. SMPY includes individuals identified in 7th/8th grade as in the top 1% or higher in mathematical or verbal ability, and a comparison group identified as top STEM graduate students. SMPY findings cover the educational and occupational attainments of participants, including a large percentage earning a degree or pursuing high powered careers in STEM; gender differences; the extent to which high school experiences, abilities, and interests predict later outcomes; and subsequent creative production. Mathematical reasoning ability as measured by standardized tests is a reliable predictor for later math/science engagement and achievement in adulthood, and spatial ability adds predictive value. Exposure to appropriate educational opportunities do correlate with career achievement and creative production. SMPY researchers have concluded that potential future STEM innovators can be identified early and that educational interventions can increase their chances of success.

In April 2011, a group of 110 business executives, including the former CEO of Intel, issued a call for states to adopt tougher standards on math and science tests. The group, Change the Equation, also encouraged states to address gaps in achievement among different racial groups (Koebler, 2011). Change the Equation's call to action closely followed the release of *The Case for Being Bold* by the Institute for a Competitive Workforce (ICW; Hess, Kelly, & Meeks, 2011). In its report, ICW, which is affiliated with the U.S. Chamber of Commerce, outlined strategies for business to use its resources and political clout to engage more intensively with science, technology, engineering, and mathematics (STEM¹) education.

This article is an elaboration of a speech given at the National Academies of Science Behavioral Research Committee Meeting, December 2009, and thus draws upon already published material. Some of the findings were previously presented in Halpern et al. (2007).

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¹Other authors in this issue of the *Peabody Journal of Education* opt to use the acronym STEM to indicate the inclusion of medical fields. We prefer the more commonly understood STEM and believe it to be inclusive of medicine among the sciences.

Efforts by these and similar groups continue more than half a century of activity by both the private sector and government to strengthen STEM education and improve U.S. economic competitiveness. In his State of the Union Address in January 2011, President Barack Obama said, “Over the next 10 years, with so many baby boomers retiring from our classrooms, we want to prepare 100,000 new teachers in the fields of science and technology and engineering and math” (The White House, 2011). Organizations like the Carnegie Corporation of New York have stepped forward to try to help the president deliver on this promise (see <http://100kin10.org/>).

There is reason to hope for a robust STEM education system. According to a recent report from the U.S. Department of Commerce, from 2000 to 2010, STEM employment in the United States grew at three times the rate of non-STEM jobs. The Department of Commerce projects growth in STEM jobs to outpace growth in non-STEM jobs until at least 2018. In addition to the expanding field, STEM workers on average earn 26% more than non-STEM workers, and they are less likely to experience unemployment (Langdon, McKittrick, Beede, Khan, & Doms, 2011).

With business and government both committed, and potentially 100,000 new STEM teachers in the pipeline, it becomes important to answer the question of where our future STEM innovators are located. Once identified, we must then decide what we need to do to nurture their talents and bring them to their fullest maturity. In its 2010 report, *Preparing the Next Generation of STEM Innovators: Identifying and Developing our Nation’s Human Capital*, the National Science Board made three keystone recommendations and suggested multiple accompanying policy actions in an effort to answer these questions. Its broad recommendations were to “provide opportunities for excellence,” “cast a wide net,” and “foster a supportive ecosystem” (National Science Board, 2010). By reviewing the history and research findings of the Study of Mathematically Precocious Youth (SMPY), we hope to throw further light on the twin challenges of talent identification and talent development.

SMPY

The SMPY is one of the earliest attempts to answer questions like those just presented. Julian C. Stanley, of Johns Hopkins University, founded the study in 1971. Now directed by Camilla Persson Benbow and David Lubinski, SMPY has been tracking more than 5,000 individuals, in five cohorts, for more than four decades, with a particular focus on mathematical talent. Planning at least a 50-year study, the SMPY is currently collecting data on participants at age 50, an age that many believe provides a first but strong glimpse of participants’ professional accomplishments.

Design of SMPY

Although a detailed description of the SMPY longitudinal study can be found in Lubinski and Benbow (2006), here we provide a brief description. SMPY’s first cohort contained seventh or eighth graders (or students of approximately 13 years of age) from the greater Baltimore area. Identified as intellectually talented in the early 1970s, this cohort represents the top 1% in mathematical ability. The second cohort comprised seventh graders from the Mid-Atlantic

region who had scored in the top .5% in mathematics or verbal ability, or both. The third cohort included those from across the nation who were identified in the early 1980s, and before age 13, as being in the top 1 in 10,000 in math, verbal, or both abilities. The fourth cohort, drawn from the Midwest in the late 1980s and early to mid-1990s, represents the top .5% in ability in math, verbal, or both as determined in the seventh or eighth grade. The fourth cohort included a comparison group of less able individuals but nonetheless in the top 5%. In all, there were more than 5,000 individuals in Cohorts 1 to 4 who were identified using the College Board's Scholastic Aptitude Test (SAT), now called the Scholastic Assessment Test. Although the SAT is normally administered to high school juniors or seniors, SMPY administered the tests to individuals 4 to 5 years younger in age and selected for further study those meeting the ability criteria just described. For these 13-year-olds, the SAT is an especially strong measure of mathematical or verbal reasoning ability. The test has demonstrated both reliability and validity with this younger population. Collectively they possessed the potential, when identified by age 13, for high, even extraordinary, achievement, in math or the sciences (Lubinski & Benbow, 2006).

At multiple points, the SMPY participants have completed comprehensive surveys and inventories that provide a detailed view of their development and educational or career trajectories. Although earlier data collection points occurred at ages 13, 18, and 23, the last administered survey took place when participants were in their mid-30s. As indicated, the next survey has begun with participants at age 50. Because all groups were identified using the SAT at about the same age, researchers have used data from later cohorts to determine the replicability of their findings. Replicability is a powerful aspect of the study, and some SMPY studies do not reach publication until findings have been confirmed with another cohort. Another benefit of having multiple cohorts separated in ages is that it allows SMPY to roughly assess the impact of having grown up in different times.

In practical terms, not all future STEM talent can be identified using the SAT at age 13. SMPY's fifth cohort was therefore established to determine whether the study's findings are generalizable. Cohort 5 consists of 714 individuals, educated in the United States, who were enrolled in the top 15 U.S. graduate programs in STEM. Although this is an extremely high level of achievement in STEM for the approximate ages of 23 to 24, it still produced sufficiently large numbers of individuals for quantitative analysis. In an effort to maintain an equal sample of male and female students, women had to be oversampled as the male:female ratios in these graduate departments often exceeded 3:1. Cohort 5 was studied retrospectively, concurrently, and now prospectively (age 33 and beyond) by Lubinski, Benbow, Shea, Eftekhari-Sanjani, and Halvorson (2001) and Lubinski, Benbow, Webb, and Bleske-Rechek (2006).

THEORY OF WORK ADJUSTMENT

The Theory of Work Adjustment guides SMPY's work (Dawis & Lofquist, 1984). As described by Lubinski and Benbow (2000, 2006) and paraphrased here, Theory of Work Adjustment assesses both the individuals and their environments equally. The study splits the individual's learning or work personality into two major components—abilities and preferences (interests and values)—while splitting their environment into ability requirements (for meeting performance expectations) and incentives (for acknowledging and compensating performance). Large

individual differences in capability result in important outcome differences in education and the world of work (Lubinski, 2000).

According to Theory of Work Adjustment, educational commitment, occupational choice, and persistence are functions of two major dimensions of correspondence: *satisfaction* (correspondence between needs and rewards) and *satisfactoriness* (correspondence between ability and ability requirements). Satisfaction is a subjective determination made by individuals, whereas satisfactoriness is determined objectively by educators and supervisors based on performance. Satisfaction determines whether and how much an individual is motivated to remain in a particular environment, whereas satisfactoriness determines how motivated employers may be to retain an employee. Both satisfaction and satisfactoriness must be present for individuals to remain in educational or occupational settings.

MATHEMATICAL TALENT AND STEM INNOVATION

SMPY data have already yielded valuable information about how potential, as measured by the SAT, translates into achievement in math/science. The data also offer insights into who, among those with the requisite abilities to become STEM professionals or STEM innovators, embarks upon such career paths in the first place.

Individuals in the top 1% in mathematical reasoning ability, as assessed by age 13, did become highly educated. More than 90% earned a bachelor's degree, whereas more than 25% earned a doctorate, with essentially no gender differences in degrees earned (Benbow, Lubinski, Shea, & Eftekhari-Sanjani, 2000). About 50% earned at least one postsecondary degree in the STEM areas. Among the top .5% in mathematical ability, 64% secured at least one postsecondary math or science degree (Benbow et al., 2000). Men were at least twice as likely as women to earn degrees in the inorganic sciences and engineering. At the doctoral level, there were almost 5 times as many male as female students. Yet, in the life sciences and in medicine, there were more women than men, including at the doctoral level (Benbow et al., 2000). The career choices of these mathematically talented individuals followed the pattern seen for degree specialization. Men were more heavily represented in mathematics, computer science, engineering, and the physical sciences, whereas women were somewhat more represented in the life sciences and medicine (Benbow et al., 2000).

SMPY also studied those mathematically talented individuals who had planned to major in a STEM area as beginning undergraduates at more depth at approximately age 33. We wanted to better understand the factors that differentiated those who remained in the math-sciences and earned such a degree from those who opted to pursue undergraduate degrees in other areas (Webb, Lubinski, & Benbow, 2002). More men had declared an intention to pursue a STEM degree than had women; there was also greater attrition from the math and sciences by women than by men (26% vs. 17%). High school educational experiences, abilities, and interests were found to predict whether an undergraduate degree was indeed attained within the math and sciences or whether the individual left to pursue other areas of study. Those who persisted with a math or science degree had more high school coursework in mathematics and science, and more often reported a math or science course as their favorite (or a humanities course as their least favorite). They were also more mathematically able, and their occupational interests as measured by the

Study of Values and Holland Occupational codes were more congruent with math and science professions.

The Webb et al. (2002) study probed further the educational and occupational outcomes of those individuals who left the math and science field sometime during their undergraduate years. Although those who left did so primarily for reasons involving interests, they nonetheless went on to earn educational credentials comparable to those who remained in STEM areas and pursued similarly prestigious occupations. Somewhat surprisingly, 17% subsequently returned to the math and sciences field, calling into question the commonly held assumption that once one leaves the math and science pipeline, it is very hard to return.

SMPY also compared math and science achievement between the top and bottom quartiles of the top 1% in mathematical reasoning ability at age 13 (Benbow, 1992; Wai, Lubinski, & Benbow, 2005). Of 37 math and science achievement variables assessed at age 23, we found statistically and substantively significant effect sizes favoring the top versus the bottom quartile on 34 of the 37 variables (Benbow, 1992). Gender differences were found, but these were smaller than the differences between the top and bottom quartiles. We did not observe gender differences in the relationship between mathematical ability and academic achievement. The same pattern was observed at age 33 when we studied secured doctorates, math and science Ph.D's, income, patents, and tenure-track positions at top U.S. universities (Wai et al., 2005).

In subsequent studies, Park, Lubinski, and Benbow (2007, 2008) looked at creative production when SMPY participants were in their mid-40s. Searching Google Scholar, web pages, and the U.S. patent database, researchers determined that higher creative production was associated with higher ability as measured by the SAT at age 13. This occurred regardless of the graduate school attended.

Collectively, the studies just discussed and Ferriman-Robertson, Smeets, Lubinski, and Benbow (2010) rendered false the assertions made by such writers as Malcolm Gladwell (2008) in *Outliers*, Renzulli (1986), Brooks (2011), and the authors of a letter published in *Science* (Muller et al., 2005), who claimed, "There is little evidence that those scoring at the top of the range in standardized tests are likely to have more successful careers in the sciences. Too many other factors are involved" (p. 1043). SMPY has repeatedly found that more ability, especially in mathematics, does matter for achievement in STEM. When coupled with a congruent preference pattern, ability becomes an even better predictor of both the discipline in which one is likely to earn a 4-year degree (Achter, Lubinski, Benbow, & Eftekhari-Sanjani, 1999) and one's future occupational setting at age 33 (Wai et al., 2005).

These findings are all based on participants in Cohorts 1 to 4, but they needed to be replicated with a different sample. To do this, SMPY turned to Cohort 5 (the 714 graduate students enrolled in the top 15 math-science graduate programs). Like the previous cohorts, these students had world-class talent as well as psychological profiles that corresponded to what earlier studies had found to characterize distinguished scientists: exceptional quantitative reasoning abilities (the modal GRE-Q score was 800), relatively stronger quantitative than verbal reasoning ability, salient scientific interests and values, and persistence beginning at an early age in seeking out opportunities to study scientific topics and develop scientific skills (Lubinski et al., 2001). As in areas such as athletics and arts, the process of developing scientific talent had begun and was sustained as early as the fifth grade. For those graduate students with these attributes, sex differences were minimal. SMPY researchers concluded that exceptional scientific expertise requires special educational experiences and personal characteristics and that these necessary experiences and characteristics

operate similarly for both men and women. Researchers also determined that the earlier findings on the SMPY sample generalized to another group (i.e., Cohort 5) selected using entirely different criteria on the basis of their potential to pursue scientific careers.

The graduate students in Cohort 5 were followed up on 10 years later when they were in their mid-30s and compared to a SMPY group of similar age who had achieved scores prior to age 13 that placed them in the top 1 in 10,000 in cognitive ability (verbal or mathematical; Lubinski et al., 2006). The latter group had been selected solely on the basis of this exceptionally high test score. Both groups were found to have achieved comparable and exceptional success, and they both reported high and commensurate career and life satisfaction. Almost 80% of the graduate students had indeed earned a doctorate, whereas 55% of the high-ability group had. (The base rate for earning a doctorate in the United States is 1%.) Almost 70% of the graduate students were postsecondary teachers, engineers, or scientists compared to 46% of the high-ability group. (Given the selection criterion, it was remarkable that the differences were not larger on these variables.) In terms of patents secured, an indicator of creativity and “inventive and scientific productivity” (Huber, 1999, p. 49), all groups exceeded base rate expectations of 1% for the U.S. population. Thirty-two percent of male graduate students and 21% of female graduate students had earned patents, compared to 18% and 4%, respectively, in the high-ability group. Data also showed that the necessary attributes for high achievement in STEM areas, and the talent development process itself, do not change depending on gender. Different variables are not needed to explain the scientific success of women in comparison to men. The relevant variables, however, do need to be examined collectively and not in isolation.

Collectively, the studies just described speak to the effectiveness of mathematical reasoning ability as a predictor for later math/science achievement. Prediction can be further refined when spatial ability is considered, especially if one considers the relative strength of mathematical ability compared to verbal ability (profile tilt). Such distinctions in intellectual strengths, even when observed at an early age, can predict sharp differences in how individuals will develop and which occupations they will pursue (Achter et al., 1999; Lubinski, Webb, Morelock, & Benbow, 2001).

SPATIAL ABILITY AND OCCUPATIONAL CHOICE

Along with mathematical and verbal ability, spatial ability is the third major specific ability in the structure and organization of human abilities (Carroll, 1993; Snow & Lohman, 1989). Engineering, architecture, physics, chemistry, and medical surgery are occupations long associated with a proficiency in spatial ability (Smith, 1964; Snow & Yalow, 1982). Spatial ability is also a salient characteristic of physical scientists (Gohm, Humphreys, & Yao, 1998; Humphreys, Lubinski, & Yao, 1993). Schools, however, do not assess spatial ability with any frequency, nor is the presence or lack of spatial ability used much to counsel students. According to the 13-year longitudinal study conducted by Humphreys et al. (1993) of 400,000 high school students assessed on mathematical, verbal, and spatial abilities, STEM disciplines appear to be losing many talented individuals because selection for such educational tracks is limited only to mathematical and verbal abilities. Wai, Lubinski, and Benbow (2009) arrived at the same conclusion when reviewing 50 years of data on spatial ability.

Yet spatial ability manifests its importance whether or not the educational system accounts for it. Shea, Lubinski, and Benbow (2001) applied multivariate statistical methods, using age

13 SAT math (SAT-M), SAT verbal (SAT-V), and a spatial ability composite for top .5% in ability individuals, to predict developmentally sequenced educational and vocational outcomes including (a) favorite and least favorite high school course, (b) field of undergraduate degree, (c) field of graduate degree, and (d) occupation at age 33. Spatial ability was found to add incremental validity to SAT-M and SAT-V assessments in predicting educational and vocational outcomes over 20 years. Intellectually talented adolescents with stronger spatial ability relative to verbal ability were more likely to be found in engineering and computer science fields. Those with the inverse ability pattern tended to gravitate toward humanities, social science, organic science, medical arts, and legal fields. A similar pattern also emerged for relative strengths in quantitative versus verbal abilities, with spatial ability exhibiting somewhat greater overall discriminative power. That is, students who were relatively more verbally able than quantitatively or spatially able gravitated toward the humanities and social sciences, whereas those with the opposite ability pattern leaned more toward engineering and the physical sciences. Webb, Lubinski, and Benbow (2007) obtained similar results with an independent sample of 1,060 high-ability adolescents tracked for 5 years.

Lubinski et al. (2001) conducted a more definitive study with a sample of exceptional high-ability (top 1 in 10,000) individuals and found that those whose strength was in mathematics compared to verbal, but who nonetheless had very high verbal ability, reported mathematics and science courses as their favorite in high school and college. This group also disproportionately pursued educational credentials in STEM areas, reporting 3 times as many awards and special accomplishments in science and technology as compared to the humanities and arts. Those whose ability pattern favored verbal over mathematic ability reported favorite courses in humanities in high school and college, disproportionately pursued educational credentials in the humanities and law, and reported twice as many awards and special accomplishments in the humanities and arts compared to sciences and technology. Those with profiles of relatively equal verbal and mathematical ability fell somewhere in between. Because this sample of profoundly gifted participants possessed higher quantitative reasoning abilities than the typical physical scientist, the ability tilts were seen as especially revealing. The investigators concluded, with confidence, that the tilt in the ability profile predicts the nature of achievement years later.

Some gender differences in ability tilts must be acknowledged—men more frequently than women, exhibited a tilt favoring mathematical and spatial ability over verbal ability, regardless of level. Women, on the other hand, tend to be more balanced than men in their ability profiles. This may also relate to their less frequent choice of STEM careers than their male counterparts.

LIFESTYLE PREFERENCES AND STEM INNOVATION

Occupational choices are not made in isolation or independent of other life decisions, such as the decision to marry, to have children, or to live close to relatives (Eccles, 1994). Many high-achieving women experience conflict between traditionally feminine values and goals (e.g., caring for children) and the expectations of traditionally masculine activities oriented toward high achievement and competition (Browne, 2002; Eccles, 1994). Intellectually talented men in their mid-30s tend, on average, to focus more on career, to work longer hours, and to be willing to work longer hours than similarly talented women who report a preference for a life with a balanced approach to career, family, and friends (Benbow et al., 2000; Ferriman, Lubinski,

& Benbow, 2009; Lubinski, 2004; Webb et al., 2002). Sustained over time, such preferences may help explain the current underrepresentation of women in high levels of science (Eccles, 1994). Men in the SMPY sample reported higher incomes, but that difference disappeared when researchers adjusted the study for hours worked. It must also be emphasized that, on all indicators examined, talented men and women in their mid-30s reported feeling equally positive about themselves and their accomplishments.

Although the aforementioned studies clearly indicate that we can identify talent as early as age 13, and that this is the pool of individuals from which future STEM innovators will emerge, they do not tell us whether we can increase the likelihood of developing this talent to the point of fruition. Wai, Lubinski, Benbow, and Steiger (2010) presented data revealing that this is, in fact, possible. Wai et al. (2010) introduced the concept of educational dose, which is a way of describing the educational facilitation and intervention that talented individuals receive during their schooling. Some talented individuals are fortunate and attend schools highly responsive to their exceptional educational needs (they receive a high educational dose), whereas other individuals will languish in the regular classroom without any modifications to the curriculum (receiving a low educational dose). By age 40, Wai et al. found that those who experienced a high educational dose achieved more than those with no or a low dose.

Greg Park, as part of his dissertation, compared students who were accelerated by at least a year with students who were not accelerated (Park, Lubinski, & Benbow, 2011). The two groups were matched on a dozen relevant variables. Park found that those who were accelerated had achieved more career-wise with more creative production by their mid-40s than had those who were not accelerated. Given the sophistication and extent of the matching procedure, acceleration had to be the most likely cause for the differences in achievement. Numerous other studies have come to the same conclusion (e.g., Rogers, 2007; Swiatek & Benbow, 1991a, 1991b). However, the other studies were less rigorously designed than Park et al. (2011). This supports the National Mathematics Advisory Panel's (2008) conclusion that, as a policy, acceleration should be a means for meeting the expressed needs of mathematically talented students.

CONCLUSION

We began this article by asking whether we can identify individuals early on who are likely to become STEM innovators, and whether, once identified, we can increase the chances they will become STEM innovators—a phenomenon that is extremely rare. Based on the data and findings presented in this review, the answer to both of these questions is yes. Schools can increase their ability to produce future STEM innovators for our conceptual economy through proper identification procedures followed by educational interventions that are responsive to children's needs. Doing so has the potential to provide an economic edge in an increasingly competitive global society.

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Pathways to a STEMM Profession

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The inadequate number of American young adults selecting a scientific or engineering profession continues to be a major national concern. Using data from the 23-year record of the Longitudinal Study of American Youth (LSAY) and working within the social learning paradigm, this analysis uses a set of 21 variables to predict young people's employment in science, technology, engineering, mathematics, or medicine (STEMM) at ages 36 to 39. The LSAY is one of the longest and most intensive longitudinal studies of the impact of secondary education and postsecondary education conducted in the United States. Using a structural equation model, the study found that mathematics continues to be a primary gateway for STEMM professions, beginning with algebra track placement in grade eight and continuing through high school and college calculus courses. Home and family factors such as parent education and parent encouragement of science and mathematics during secondary school also enhanced the likelihood of entering a STEMM profession.

From the launch of Sputnik in 1957 to today, there has been a continuing national discussion on whether or not the United States has an adequate number of young people entering the scientific and technical workforce. Presidential commissions, Congressional committees, National Academy task forces, disciplinary societies, and business groups have studied the issue and produced a library of recommendations (The National Academies, 1993, 1999; National Academy of Engineering and the National Research Council, 2005; National Research Council, 1999a, 1999b, 2001; National Science Board, 2006). In their report entitled *Rising Above the Gathering Storm*, the National Academies defined the flow of young adults into scientific, engineering, and related fields as the key to the future prosperity of the United States (The National Academies, 2007). Failing to build and maintain a competitive scientific workforce in the decades ahead may in fact lead to a decline in the American standard of living.

PREVIOUS STUDIES

Although there are a number of general career choice models, Super (1957, 1980; Super & Bowlsbey, 1979) introduced the idea that career choice begins early and continues over the course of the lifespan. Although the majority of work in this field has focused on the influences that shape decisions early in life, Super provided a useful framework by asserting that individuals

make career decisions throughout their lives, both about the course of a career within a field and about changing fields altogether.

Holland (1973, 1985) viewed the career choice process as the product of basic personality and life preferences within the context of available options. Using personality theory, Holland identified six clusters of personality and work preferences that he translated into diagnostic testing instruments, many of which still see use in today's career counseling. Despite the wide use of these diagnostic tools, several studies have found weak relationships between these constructs and actual career choices (O'Neil, 1977).

Building on broader social science constructs, Krumboltz (Krumboltz, 1996; Krumboltz, Mitchell, & Jones, 1976; Mitchell & Krumboltz, 1984, 1990) outlined a life-cycle framework, incorporating an array of social and contextual variables that reflected the flow of decisions and options that most individuals encounter during adolescence and young adulthood. Referred to as the *social learning* approach, Mitchell and Krumboltz (1984) asserted that "social learning theory recognizes that humans are intelligent, problem-solving individuals who strive at all times to understand the reinforcement that surrounds them and who in turn control their environments to suit their own purposes and needs" (p. 236). Krumboltz et al. (1976); Farmer (1978); and Mihal, Sorce, and Comte (1984) also offered multivariate models that described the role of parents, teachers, counselors, peers, media, and other factors in the development of career thinking and plans by adolescents and young adults. Rooney (1983) followed a sample of students 3 years after high school, building on earlier surveys of the same students by Farmer. Miller and Brown (1992a, 1992b) reported an early longitudinal model based on the first 4 years of the Longitudinal Study of American Youth (LSAY). The analytic models in this analysis utilized a social learning approach to understand the experiences and decisions that shape career thinking from secondary school through young adulthood.

A number of studies have also examined the development of student and young adult interest in science, technology, engineering, mathematics, and medicine (STEMM) careers. Lent, Brown, and Hackett (2000) integrated a wide array of career choice research into a summary model based on Bandura's (1986, 1989, 1991) social cognitive theory. Dick and Rallis (1991) applied earlier models (Eccles, 1986, 1994; Meece, Parsons, Kaczala, Goff, & Futterman, 1982; Parsons, Adler, & Kaczala, 1982) and found that science career choices for women were influenced by contextual and socializing factors more often than curricular experiences.

Several authors have examined an early interest in STEMM careers using longitudinal data. Ethington and Wolfe (1988) used High School and Beyond data to examine the factors associated with women majoring in a quantitative field 2 years after high school. Maple and Stage (1991) used High School and Beyond data to examine the factors related to quantitative majors in college, testing separate models for Black women, White women, Black men, and White men. All of these groups were influenced by high school math and science courses and test scores. Farmer, Wardrop, Anderson, and Risinger (1995) reinterviewed 173 ninth- and 12th-grade students who had expressed an interest in a STEMM career 10 years earlier and found that persistence by women was related to the number of science courses taken in high school.

More recently, several analysts have offered broad theories of career development by building on the metaphor of chaos theory (Bloch, 2005; Bright & Pryor, 2005) and recognizing that individual decision-making sequences are frequently nonlinear. Peterson, Krumboltz, and Garmon (2005) have reconceptualized the social learning process within the context of both the chaos metaphor and emerging information technologies.

Porfeli, Niles, and Trusty (2005) contributed a useful discussion of the major theories of career development over the last 50 years by identifying several common threads that run through all of these models. There is a general agreement that career plans and preferences develop over relatively long periods, with periodic reality adjustments. Because of this long cycle, effective modeling of the process requires measurement over a number of years and, ideally, through several stages of life development.

METHODS

Following the same individuals along the path from secondary school into college and frequently into graduate or professional school is necessary to understand the career development process of these individuals. The data from the LSAY provide a rich empirical description of student experiences in middle school, high school, college, and graduate or professional schools as well as relevant life experiences throughout those years. To provide a comprehensive longitudinal examination of the development of student achievement in middle school and high school (and the relationship of those patterns to career choices), the National Science Foundation (NSF) funded the LSAY in 1986. After 1 year of pilot testing, the LSAY began collecting data from a national probability sample of seventh- and 10th-grade students in 50 public school systems in the United States in the fall of 1987. During the next 7 years, researchers gave approximately 5,900 LSAY students mathematics and science achievement tests (based on NAEP item pools) and asked those students to complete extensive attitudinal and activity report questionnaires each fall and spring. A summary of LSAY data collection activities is available at <http://www.lsay.org>.

In 2006, the NSF funded the resumption of LSAY data collection. Using online tracking resources and previously collected family contact information, the LSAY staff were able to account for more than 95% of the original 5,945 students in the LSAY. Some of the students in the original sample are deceased, some were the children of foreign graduate students who returned to their home country, and some were medically or mentally unable to continue participation. In addition, two of the original schools closed early in the study rendering it impossible to continue data collection from those students, teachers, or schools. On the basis of a thorough search, the LSAY staff was able to identify an *eligible sample* of 5,091 young adults (Kimmel & Miller, 2008). In 2007, each former student in the eligible sample received a letter and questionnaire, and the LSAY now collects data on an annual schedule.

This analysis utilizes a consolidated file (including both cohorts) that includes data from 3,945 participants (77% of the eligible sample) who completed the 2007 survey. The file was weighted to reflect the school and gender composition of the original LSAY sample and represents a weighted probability sample of public school students in 1987, with adjustments for death, illness, and migration out of the country.

The Flow of Young Adults Into STEMM Professions

The pathway to a STEMM profession begins at home. Decades of educational and social science research has documented the influence of parents on student educational aspirations (Heppner & Scott, 2004; Whiston & Keller, 2004). Virtually all parents provide the first exposure of their children to language, which provides the foundation for future learning in school and in society

(Berger & Luckmann, 1966). Although schooling can expand and enhance a child's reading ability, the literature suggests that there are substantial differences in initial reading readiness and skills among children when they reach formal schooling. Many of these differences persist throughout school and beyond (Entwisle, Alexander, & Olson, 1997; Lee & Burkam, 2002; Massey, 2007; Sexton, 1961). Beyond language skills, parents convey important attitudes toward the value of education and the importance of school achievement.

Some parents overtly encourage their children to engage in scientific, mathematical, and technological activities. This encouragement includes the selection of toys, the availability of devices from calculators to computers, and building things from either raw materials or preformed sets. Some parents utilize informal learning resources such as science museums, zoos, aquariums, planetariums, and similar facilities to introduce their children to interesting objects and to encourage science learning. The cumulative effect of this smorgasbord of home and community resources supplements formal schooling and provides these children with a substantial advantage during their years of elementary and secondary schooling.

Children also learn about science from a combination of school, media, and peer experiences. From kindergarten forward, children are exposed to a stream of lessons, films, field trips, and science fair projects designed to foster an interest in science and an acquisition of basic scientific concepts. Despite these experiences, comparative international testing suggests that American students learn less science in school than comparable students in Europe, Japan, or many other countries (McKnight et al., 1987; National Center for Educational Statistics, 2007; Organization for Economic Cooperation and Development, 2007; Schmidt, 2003; Schmidt, McKnight, & Raizen, 1997). A full discussion of the factors that produce this result is beyond the scope of this analysis, but readers should be aware that school learning is important in any discussion of the development of early interest in STEMM careers.

Parallel to school experiences, the growing volume of television and motion pictures that include images of science and technology expose students to concepts related to the STEMM field. In the late 1980s, LSAY students may have seen *E.T.* or *Star Wars*, may have watched any number of television drama series built around medical forensics, and may have first heard about DNA in one of the innumerable television crime stories.

Although U.S. society exposes children to a variety of images and ideas about science during their elementary and secondary school years, there is little evidence that these early events influence the eventual selection and pursuit of a career in a STEMM profession. There is, however, substantial support for the impact of parent and home factors in the literature (Davis-Kean, 2005). The data from the LSAY confirm the parents' pervasive influence on the system. At the most basic level, the likelihood that a young adult will enter postsecondary study is closely related to the level of the parents' education (see Table 2). Nearly half of the children of parents without a high school diploma (or GED) never enroll in post-secondary education (PSE), compared to only 8% of the children of parents with a graduate or professional degree. And young adults who do not seek a baccalaureate will not become STEMM professionals.

Although the career preferences of high school students often change in college and during young adulthood, the expected college major of high school students persists as one of the first steps toward a STEMM career. High school career intentions are important because they inform many of the decisions that students make in regard to the selection of classes and the level of effort expended on specific courses and academic work in general. Subsequent analyses will show that some of the high school students who express a preference for a STEMM career may migrate into non-STEMM fields, but very few students who did not plan to major in a STEMM field will

migrate into these careers later in the process. With this pattern in mind, it is important to study the factors related to the intended college major of high school seniors.

Although the level of parental educational attainment is strongly related to entrance into PSE, it is only moderately related to a student's intention to major in a STEMM field in college. Approximately 25% of the children of college graduates plan to major in a STEMM field compared to 16% of the children of parents with only a high school diploma (see Table 1). The LSAY data

TABLE 1
Distribution of High School Student Plans to Major in a STEMM Field in College

	Expected College Major		Less Than Baccalaureate	N
	STEMM	Non-STEMM		
All LSAY respondents	19%	24%	57%	3,945
Student gender				
Female	16	29	55	1,935
Male	22	20	58	2,010
Parent education				
Less than HS	7	12	81	259
HS graduate	16	20	64	1,802
Some college	22	19	59	572
Baccalaureate	24	34	42	690
Graduate or professional	25	37	38	600
Parent college push				
0 (low)	3	7	90	306
1	10	13	77	562
2	18	27	55	1,544
3	28	33	39	1,106
4-5 (high)	38	33	29	245
Parent science-math push				
0 (low)	7	16	77	645
1	10	22	68	621
2	13	28	59	757
3	19	27	54	1,047
4	38	25	37	753
5 (high)	49	19	32	121
Algebra track				
No algebra course in HS	2	2	96	404
Algebra I in Grades 10-12	9	18	73	1,082
Algebra I in Grade 9	25	31	44	1,816
Algebra I in Grade 8	37	37	26	502
Race/Ethnicity				
Hispanic American	11	22	67	311
African American	23	21	56	369
Asian American	32	26	42	137
Native American	11	9	80	53
Other American	20	26	54	2,843

Note. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; HS = high school.

suggest that overt parent encouragement of college attendance and of science and mathematics are substantially more important factors. A measure of *parent college push* illustrates the power of parent encouragement. Only 3% of students who experienced low parent encouragement to attend college planned to enter a postsecondary program and major in a STEMM field, compared to 38% of students whose parents strongly encouraged college attendance. Overt parental encouragement of science and mathematics was equally influential.

Elementary and secondary schools provide instruction in and early exposure to science and mathematics. These schools, however, vary in the scope and quality of their instruction. The selection of a school reflects a mix of parent, community, and economic factors, but some parents overtly seek high-quality schools for their children within their geographic and economic limits. Although a thorough analysis of the school selection process is beyond the scope of this analysis, readers should recognize that parent and school resources are often related.

Within the school context, there are some important decision points. One of the most important is the timing of the initial study of algebra and the completion of a calculus course during high school. In the late 1980s, approximately 13% of students took their first algebra course in Grade 8 and 46% started algebra in Grade 9. Another 27% took an initial algebra course in Grades 10, 11, or 12. The timing of the initial algebra course is important because the hierarchical structure of mathematics instruction makes it difficult for students who do not begin algebra in Grade 8 to complete calculus by Grade 12. In practice, the sorting of students into algebra tracks constitutes the primary form of high school tracking in the United States and is a strong predictor of subsequent enrollment in honors courses and advanced placement courses in all subjects. It is no surprise that the proportion of high school seniors who expect to major in a STEMM field positively relates to the timing of these students' initial algebra course (see Table 1).

We also note that there are some differences by race and ethnicity in plans to prepare for a STEMM career. As other studies have found, Hispanic American, African American, and Native American students are significantly less likely to enroll in PSE, and the small sample sizes for these groups make other comparisons perilous. From other multivariate analyses, we know that a substantial portion of the race and ethnicity differences shown in Table 1 are accounted for by differences in parent education, home resources, and differential school experiences. Because of these limitations, we are not able to provide a separate analysis of the impact of race and ethnicity on the selection of a STEMM career, but we feel obligated to note the disparities shown in Table 1.

Although high school juniors and seniors hold sincere expectations about their future college plans, the literature documents significant slippage between intentions and actual PSE enrollment. In the broader framework of adolescent socialization and development, this is not surprising. The transition from high school to college requires an extensive application process, potential relocation from the parental home, and allocation of funds to finance postsecondary study. The transition may also involve the disruption of social networks and close personal relationships. This period has thus become both an important rite of passage for many young people as well as an important gateway on the path to a STEMM profession.

Using the same variables that were employed to look at intended college majors, we turn to an examination of the factors associated with initial postsecondary enrollment in a STEMM field. In

TABLE 2
Student Enrollment in a Postsecondary STEMM Program

	PSE Enrollment in . . .		No PSE	N
	STEMM	Non-STEMM		
All LSAY respondents	23%	55%	22%	3,945
Student gender				
Female	20	60	20	1,934
Male	25	50	25	2,011
Parent education				
Less than HS	13	40	47	258
HS graduate	22	51	29	1,801
Some college	23	55	22	572
Baccalaureate	25	65	10	690
Graduate or professional	28	64	8	599
Parent college push				
0 (low)	11	30	59	306
1	17	49	34	561
2	23	57	20	1,544
3	27	63	10	1,105
4–5 (high)	31	66	3	245
Parent science-math push				
0 (low)	16	47	37	645
1	15	58	27	622
2	18	58	24	758
3	24	59	17	1,047
4	35	53	12	753
5 (high)	40	47	13	122
Algebra track				
No algebra course in HS	9	29	62	405
Algebra I in Grades 10–12	16	54	30	1,083
Algebra I in Grade 9	27	60	13	1,816
Algebra I in Grade 8	36	61	3	502
Race/Ethnicity				
Hispanic American	18	50	32	311
African American	23	49	28	369
Asian American	33	62	5	138
Native American	32	36	32	53
Other American	23	57	20	2,844

Note. STEMM = science, technology, engineering, mathematics, and medicine; PSE = postsecondary educational institutions; LSAY = Longitudinal Study of American Youth; HS = high school.

looking at the table, we see that 23% of LSAY students enrolled¹ in a PSE program in a STEMM field after completing high school (see Table 2).

¹In most cases, the enrollment occurred the year following the completion of high school, but in some cases the student may have deferred initial enrollment for a variety of reasons, including military service. One of the advantages of a longitudinal study that spans a number of years is that we can examine the behavior of interest regardless of its timing.

Most of the parental, family, and school factors associated with the intention to major in a STEMM field were associated with actual enrollment in a similar manner. The level of parental education was largely unrelated to enrollment in a STEMM field, but the level of parent college push and the level of parent encouragement of science and mathematics were positively related to PSE enrollment in a STEMM field (see Table 2). Student algebra track continued to be a strong predictor of initial PSE STEMM enrollment.

The bivariate relationships shown in Tables 1 and 2 provide a general sense of the structure of precollege life experiences and suggest some ways in which these factors influence the selection of an initial career path. Although we can look at these factors in separate tables, they occur simultaneously in the life of a student or young adult. We must then estimate the relative influence of these precollege factors before turning to an analysis of college and young adult experiences that influence entrance into a STEMM profession. For this purpose, we utilize a structural equation model to predict initial enrollment in a PSE STEMM program, utilizing the full LSAY population.

A Path Model to Predict Initial Enrollment in a STEMM Program

A structural equation path model is a useful device for estimating the relative influence of each factor in models that include several factors. In broad terms, a structural equation model (SEM) is a set of regression equations that predict each variable in the model and take advantage of our knowledge about the chronological or logical order of the variables. In a least-squares regression model, all of the independent variables are treated as occurring at the same time and the regression seeks to determine the unique contribution of each variable, holding constant all of the other independent variables in the model. All variables do not occur at the same time, however, making it analytically important to take into account the known order of predictor variables. For example, we know that parent educational attainment precedes the educational experiences and attainments of a child. Similarly, a child's gender may influence his or her educational opportunities, but educational experiences cannot change the gender of the child. Of necessity, the placement of a student in an algebra track in eighth grade precedes his or her enrollment (or nonenrollment) in a calculus course in Grade 12, and all of those experiences necessarily must precede admission to a college program. The world is structured, and we should take advantage of our knowledge of those structures to understand the pathways to a STEMM profession.

A relatively simple SEM is utilized to understand the relative impact of family and school variables during the precollege years (see Figure 1). In a path model, influence and causation flow from left to right. Variables on the left side of the model are presumed to precede variables to their right either chronologically or logically. A detailed description of the construction of each variable in the model is included in the appendix. The model was estimated using LISREL 9.0² (Hayduk, 1987; Jöreskog & Sörbom, 1993).

²LISREL is a widely used program for structural equation analysis that was created by Jöreskog and Sörbom. Version 9.0 was made available to the authors as a part of a beta test of the newest version of the program. All of the analyses were run originally with LISREL 8.8 and rerun with 9.0. All of the results were identical or within a minimal margin of error. Version 9.0 includes some improved computation algorithms and the results reported in this analysis reflect this version of LISREL.

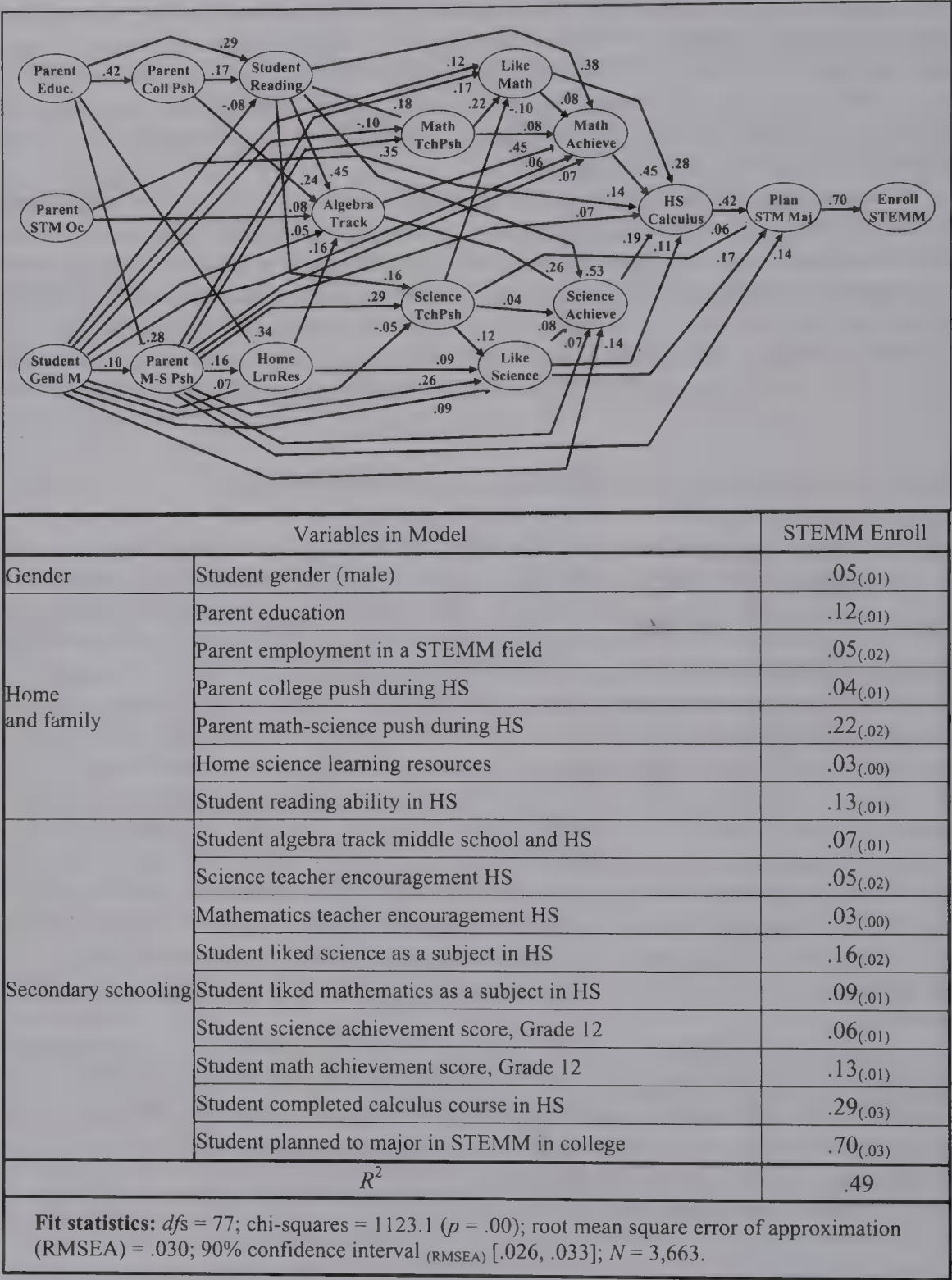


FIGURE 1 Path model to predict initial postsecondary educational institution (PSE) enrollment in a science, technology, engineering, mathematics, and medicine (STEMM) field.

For readers not familiar with this approach, it may be helpful to discuss briefly the logic of this analytic tool. Building on the basic idea that some variables occur prior to others in life, the model in Figure 1 includes student gender, parent education, and parent employment in a STEM field on the left side of the model, indicating that these factors were determined at birth or early in life and are not influenced by any other variable in the model. The frequency of parent encouragement of science and mathematics during high school may be influenced by the level of education of the parents or possibly by the gender of the child.

The results show that there is a relationship (represented by an arrow and called a path) between parent education and parent science-math push, with a path coefficient of .28 (see Figure 1). All of the paths shown are significant at the .05 level or better. This path coefficient indicates that parents with higher levels of educational attainment were more likely to encourage their child to do well in science and mathematics in high school than parents with lower levels of education. The path from gender to parent science-math push (0.10) means that LSAY parents encouraged their sons to study science and mathematics slightly more than they encouraged their daughters. This path holds constant the level of parent education and parent employment in a STEM field (Hayduk, 1987). The absence of a path from parent employment in a STEM field to parent science-math push indicates that parents who work in a STEM field did not encourage their child to study science and mathematics significantly more or less than parents not employed in a STEM job. These socialization behaviors are consistent with earlier studies by Parsons, Ruble, Hodges, and Small (1976).

This path model demonstrates that a complex combination of factors contributes to individual decisions leading to enrollment in a postsecondary STEM program (see Figure 1). A review of the paths in Figure 1 would reveal some insights into the relationships among the variables included in this model, but one of the advantages of SEM is that it provides accurate summary measures of the *total effect* of each of the variables in the analysis. Some variables in this model have a combination of positive and negative effects, and the total effect is the net effect of the variable on our outcome variable—enrolling in a PSE STEM field in the first model. For example, the paths in Figure 1 show that the parents of LSAY students provided more encouragement and more home science learning resources for their sons than their daughters, but high school girls tended to have higher reading scores than high school boys, which provides numerous advantages in school. When these advantages and disadvantages were combined, and controlling for all of the other factors that occurred during the secondary school years, the results indicated that male students were slightly more likely to enroll in a STEM program than female students, with a total effect of 0.05 (see Figure 1). This result is consistent with our observations of the enrollment data in Table 2, but it provides a more accurate estimate of the net effect of gender when a wide range of other factors are held constant.

Looking at the total effects of the variables included in this model, the major predictor is a student's intention to enroll in a PSE STEM program during high school (0.70). This result is consistent with an early socialization hypothesis. The strong influence of parental encouragement of science and mathematics during the secondary school years (0.22) supports the early socialization hypothesis as well. The low effect of parent employment in a STEM field on initial enrollment in a STEM field (0.05) is in partial conflict with the socialization hypothesis.

The modest net influence of gender (0.05) illustrates the complex interactions of family and school in the socialization process. The path diagram indicates that parents encouraged their sons slightly more than they did their daughters (0.10). Parents also provided slightly more home

science learning tools and toys for their sons than their daughters (0.07). The model indicates that parents were even-handed in encouraging college preparation and entrance. High school girls scored higher than boys on a standard reading test (−0.08), but boys scored higher than girls on a science achievement test (0.14). High school girls reported that they received more encouragement from their math teachers than boys (−0.05). Boys were slightly more likely to take algebra in Grade 8 than girls (0.05). High school boys were more likely to report that they liked math (0.12) than were girls. On balance, boys and girls each received some encouragement or advantage from some aspects of their home or school experiences, but it was a mixed set of experiences and the modest total effect suggests that the much larger gender effects found in the 1960s and 1970s were beginning to erode by the time of the study in the early 1990s.

The substantial influence of mathematics—especially calculus—on initial enrollment in a STEMM program in science or engineering is shown in the paths and total effects table in Figure 1. The total effect of taking a calculus course in high school on the likelihood of enrolling in a PSE STEMM program was 0.29. Initial algebra track placement was positively related to initial enrollment in a STEMM field (0.07), but this relationship was weaker because the critical decision point turned out to be completion of 1 year of high school calculus. The initial algebra course was an important step toward calculus—55% of eighth-grade algebra students eventually take calculus in high school compared to 7% of students who took algebra in ninth grade. Because the total effects in a structural equation model are cumulative, the combined impact of algebra track placement (0.07), student achievement score in mathematics in Grade 12 (0.13), and completion of 1 year of high school calculus (0.29) was 0.49.

The precollege model accounted for 49% of the total covariance in enrollment in a STEMM field (see Figure 1). The fit statistics at the bottom of Figure 1 indicate that this is a good fitting model.

A Path Model to Predict Employment in a STEMM Profession

The preceding analysis looked at the factors associated with enrollment in a PSE STEMM program to prepare for a STEMM profession. Although the pathway to a STEMM profession must begin with postsecondary enrollment in an appropriate program, there are many additional factors associated with the completion of a PSE program, as well as the completion of further graduate or professional training. For this purpose, we turn to an analysis of the factors that predict successful entrance into a STEMM profession.

Returning to our LSAY data, we see that 7% of students were employed in a STEMM profession 20 years after high school (see Table 3). The children of highly educated parents were significantly more likely to be employed in a STEMM profession than the children of less highly educated parents, and the influences of parent encouragement to attend college and to study science and mathematics were strongly associated with employment in a STEMM profession. The importance of taking algebra in Grade 8 continued to be a major predictor of entrance into a STEMM profession, as was the number of undergraduate calculus courses.

Young men were $2\frac{1}{2}$ times more likely to be employed as a STEMM professional than were young women 20 years after high school. A portion of this difference reflects the preponderance of young men in engineering, which is only partially offset by the preponderance of young

TABLE 3
Young Adult Employment in a STEMM Profession

	Employed in . . .			Not Employed	N
	STEMM Profession	STEMM Support	Other Occupation		
All LSAY respondents	7%	6%	69%	18%	3,945
Student gender					
Female	4	6	64	26	1,934
Male	10	6	74	10	2,010
Parent education					
Less than HS	1	6	63	30	259
HS graduate	4	6	72	18	1,802
Some college	5	6	71	19	571
Baccalaureate	11	6	66	17	690
Graduate or professional	17	5	65	13	599
Parent college push					
0 (low)	0	6	68	26	306
1	2	6	74	18	571
2	6	7	69	18	1,692
3	11	5	68	17	1,129
4–5 (high)	18	4	64	14	244
Parent science-math push					
0 (low)	2	4	74	21	645
1	3	5	74	19	621
2	5	6	70	19	758
3	5	7	70	18	1,045
4	16	8	61	15	753
5 (high)	19	5	59	17	122
Algebra track					
No algebra course in HS	0	2	69	29	404
Algebra I in Grades 10–12	1	5	73	30	1,802
Algebra I in Grade 9	9	8	69	14	1,814
Algebra I in Grade 8	20	5	62	13	501
No. of college calculus courses completed					
None	2	6	72	20	2,798
1 or 2 courses	16	8	63	13	578
3 or more courses	38	5	43	14	250

Note. This table includes only respondents who enrolled in a community college or senior college. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; HS = high school.

women in the health professions. Kimmel, Miller, and Eccles (2012/this issue) provide an in-depth analysis of the impact of gender on entrance into a STEMM profession, finding significant gender disparities in engineering and no gender disparities in medicine.

To determine the relative importance of these factors on entrance into a STEMM profession, we expanded the previous SEM model to include the number of college calculus courses and the number of college science courses completed during the undergraduate years. Additional variables were added to mark the completion of a baccalaureate program in a STEMM field,

variables to mark the completion of a graduate or professional degree in a STEMM field, and our outcome variable—employment in a STEMM profession.

Looking at the extended model, employment in a STEMM profession is the product of early parental encouragement, early algebra, high school calculus, college calculus, and a combination of appropriate undergraduate and graduate degrees (see Figure 2). Although the influence of early parental encouragement is weaker some 20 years after high school, the combined impact of parent education, parent college push, parent math-science encouragement, parent employment in a STEMM field, and home science learning resources was 0.27.

The long-term influence of algebra-track placement (0.05) reflects its role as a gate keeper to high school calculus (0.27) and eventually college calculus courses (0.29). Early student access to algebra and subsequent persistence and success in mathematics thus become essential gateways to a STEMM profession. In some STEMM professions, high school calculus is a prerequisite for admission to a PSE program. In other STEMM fields, the completion of at least 1 year of college calculus is a requirement for a baccalaureate. Although the importance of mathematics has long been recognized, there has been relatively less attention to the early decision points that have a substantial impact on the likelihood of a student's successful entrance into a STEMM profession. High school and college science courses have small positive effects on planning for and eventually entering a STEMM profession, but at every level the relative influence—measured by total effects—is smaller than mathematics.

Although many institutions devote substantial resources to increasing student interest in science, the LSAY data show that although many students hold positive attitudes toward science, a much smaller proportion of students select it as a career. In this SEM, the net effect of student attitude toward science (0.06) is a weak positive factor in influencing successful entrance into a STEMM profession.

Employment in a STEMM profession requires the acquisition of credentials, and our model documents both the importance of earning a baccalaureate (0.59) and a graduate (0.61) degree in a STEMM field. The completion of a graduate degree is not important for initial employment in engineering, but for many STEMM professions, a graduate or professional degree is a minimum requirement.

Gender is an important influence on the final determination of employment in a STEMM profession, but its influence varies over time and in ways that run counter to some of our expectations. Although a substantial amount of literature in the 1960s and 1970s documented greater parental and teacher encouragement for boys than girls in the fields of science and mathematics, the data from the LSAY paint a somewhat different picture. There were only minor differences between parental and teacher treatment of boys and girls in secondary school, and the advantages and disadvantages associated with gender was mixed. A higher proportion of young women entered postsecondary study than young men, and there were only small differences in the completion of baccalaureate programs in STEMM fields in the aggregate, although there were much larger differences in some fields such as engineering.

DISCUSSION

This analysis demonstrates that the pathways to a STEMM profession are long and complex, as Super, Krumboltz, and others suggested. To enter a STEMM profession, a student must

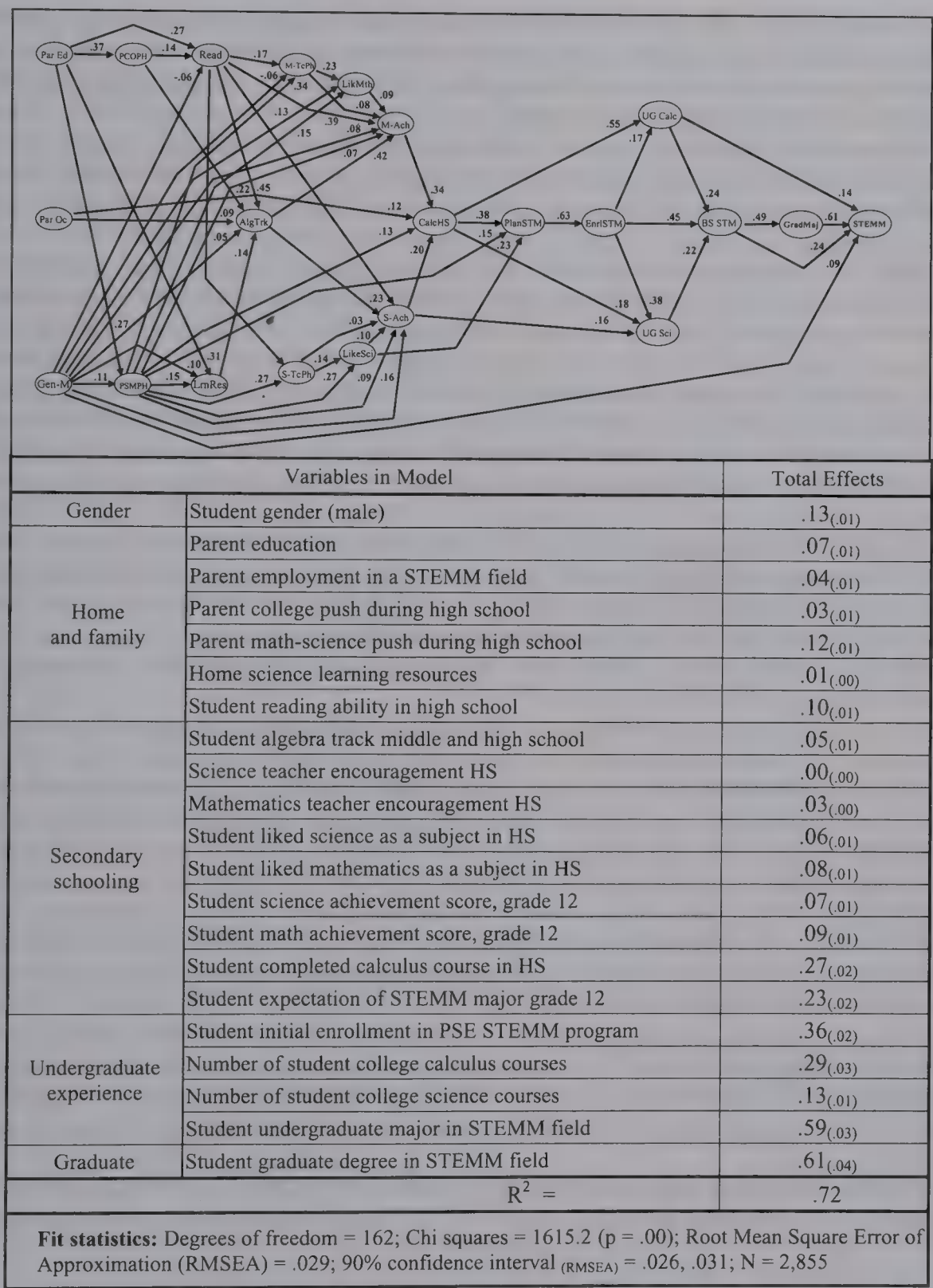


FIGURE 2 A path model to predict science, technology, engineering, mathematics, and medicine (STEMM) employment at age 36 to 39.

successfully negotiate a series of educational gates over a period of years while sustaining interest and focus. Too often, cross-sectional studies have focused on short-term influences, but this longitudinal record indicates that many factors have early roots and long-term impact (Paa & McWhirter, 2000; Turner & Lapan, 2002).

The primary points that emerge from these analyses are (a) the continuing importance of home and parental factors, (b) the central role of mathematics in becoming a STEMM professional, and (c) a persistent gender difference in employment in a STEMM profession that appears to be related to educational and career choices at the baccalaureate and graduate levels.

The LSAY model to predict initial PSE STEMM enrollment demonstrates the continuing disparities associated with parent education and its related influences. The children of less educated parents were markedly less likely to enroll in PSE of any kind, which is an automatic disqualification for potential STEMM employment at the professional level. Highly educated parents were more likely to encourage their children to learn about science overtly and indirectly through science-related books, materials, and toys. The gradual weakening of the influence of these early factors during the first two decades after high school reflects both the importance of individual student decisions and the degree of discretion that most American parents give to their children in making career choices.

For the last several decades, studies of the scientific workforce have pointed to the lack to racial and economic diversity, recommending programs to foster greater access to STEMM programs for women and for racial and ethnic minorities. In the decades after the *Bakke* decision,³ many universities have recast programs to address economic disadvantage, and the finding that parent education and home encouragement and resources continue to be an important factor suggests that much remains to be done in this area.

The second major finding from these analyses is that mathematics is the gateway to a STEMM profession. The completion of a calculus course in high school and the number of college calculus courses taken by students were two of the strongest predictors of STEMM employment in young adulthood. Traditionally, calculus was viewed as a prerequisite for engineering, physics, and chemistry, but today it is emerging as important in genetics and bioinformatics as well. Almost all undergraduate and graduate programs in science treat calculus as a prerequisite, and students see calculus as necessary for higher scores on college admissions tests.

The model to predict initial postsecondary enrollment in a STEMM field identified early secondary school algebra as a primary influence on high school math achievement, high school science achievement, and the completion of a calculus course during high school. All of these factors were positively related to initial PSE enrollment in a STEMM field. Unfortunately, this critical decision point continues to be largely invisible to most students and parents. Despite the recommendation of the National Council of Teachers of Mathematics nearly 20 years ago that a majority of students should begin algebra in Grade 7 or 8, there has been modest progress in this area.

Finally, these models point to the continuing importance of gender in understanding successful entrance into a STEMM profession. The precollege model identified several points at which

³*Regents of the University of California v. Bakke*, 438 U.S. 265 (1978) was a landmark decision of the Supreme Court of the United States on the permissible factors in an admissions program, but only for the purpose of improving the learning environment through diversity in accordance with the university's constitutionally protected First Amendment right to Academic Freedom (at pp. 311–315 of the opinion).

gender was an important influence, beginning with parental attitudes and encouragement. High school boys reported slightly more parental encouragement in science and mathematics than girls (0.10), but high school girls scored higher on reading tests than male students. In the postsecondary model, female students were more likely to earn a baccalaureate than male students, but male college students were slightly more likely to earn a baccalaureate, graduate, or professional degree in a STEMM field than female students. In a subsequent article in this issue, Kimmel, Miller, and Eccles (2012/*this issue*) examine what we currently know about the influence of personal and family factors on these decisions.

Setting aside this gender disparity momentarily, we must address the programmatic implications of the findings in regard to social class disparities and the role of mathematics on entrance to a STEMM profession. The problem is not simple and will not yield to short-term solutions, but there are some things that can and should be done.

Efforts to address disparities associated with parent education and social class must begin with a sustained focus on the precollege years and must include both parents and children. Programs like those at the Lawrence Hall of Science recognize the need for family involvement in education and the critical role of mathematics in preparing young people to prosper in the 21st century in STEMM jobs or other fields. Although there have been numerous attempts to replicate and expand programs similar to those at the Lawrence Hall, many educators and educational leaders have a clear preference for programs that operate within the public schools (and now charter schools) and that do not involve extensive parental or neighborhood involvement. Many out-of-school programs have had positive results, but in the longer term it will be beneficial to link these programs into school systems in ways that will preserve critical elements of their independence and vitality.

The algebra tracking problem is simpler in many ways—more and more schools have demonstrated that it can be done effectively—but the problem is inherently linked to the issue of differential parental and family resources. When the child of better educated parents has difficulty understanding an algebra concept or problem, he or she asks a parent to help. But a child in a family in which no parent has ever encountered algebra will find no help at home and perhaps little in the neighborhood. More than 20 years ago, Robert Moses identified the class differential in algebra as an important civil rights problem and founded The Algebra Project, with funding from the McArthur Foundation and later the NSF. Despite the good work of The Algebra Project (see <http://www.algebra.org>), there is a need to energize both the resources of school systems and the drive of parents to provide early and effective algebra exposure for all students, regardless of parental education or resources.

The first step in solving any problem is to understand it. We hope that these initial models are helpful in demonstrating the complexity of the pathways that lead to a STEMM profession and the feasibility of meaningful interventions to improve both the flow of young people into STEMM professions and the diversity of that flow.

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APPENDIX
Variables and Scales Used in Analysis of Pathways to STEMM Professions

Variable or Scale	Definition and Construction
Student gender (male)	In this model, gender was treated as a <i>dummy variable</i> and male respondents were assigned the higher value.
Parent education	This variable reflects the highest level of education attained by either parent. For single parents, the education of the single parent is used for the parent education variable. Parent education is a four-level categorical variable: less than high school, high school diploma or GED, baccalaureate, or graduate or professional degree.
Parent employment in a STEMM occupation	This ordinal variable classifies parents as not employed in a STEMM field, employed in a STEMM support job (14%), or employed as a STEMM professional (7%).
Parent college push	This five-level ordinal variable reflects the level of parent encouragement of a student to prepare for and attend PSE. The basic questions ask parents how much education that they would like their LSAY student to complete and how disappointed they would be if the student did not complete that level of education.
Parent science-math push	This six-level ordinal variable reflects student reports about various parent activities and behaviors encouraging science or mathematics.
Home science learning resources	This seven-level ordinal variable is a count of the number of science learning resources that each student reported were available in his or her home.

(Continued on next page)

Variable or Scale	Definition and Construction
Student reading score	Each LSAY student completed a reading test as a part of in-school testing. The reading test was composed of passages that were originally used in Coleman's High School and Beyond Study or the NCES National Educational Longitudinal Study of 1988. IRT methods were used to compute a reading score (0–100).
Algebra track	This is a three-level ordinal variable: (a) no algebra course in high school or algebra in Grade 10 or later, (b) algebra in Grade 9, and (c) algebra in Grade 7 or 8.
Science teacher push Mathematics teacher push	Separate five-level ordinal variables were computed for each high school science or math teacher, using student reports about the frequency of teacher encouragement to study science or math in high school and in the future.
Student attitude toward science	During secondary school, each LSAY student was asked each year how much they liked the subject matter of each course in which they were enrolled, using an A-to-F grade card format. Separate five-level ordinal variables were constructed using student responses for science and math courses.
Student attitude toward mathematics	
Student mathematics achievement score	Using the NAEP item pool, achievement tests in math and science were developed, using IRT methods. The 1st-year achievement tests were comprehensive, but subsequent tests were tailored to three levels of achievement to obtain a more accurate measure of achievement. For this model, the achievement scores for the senior year were used. The achievement scores range from approximately zero to 100.
Student science achievement score	
Student expectation of a STEM major in college	This variable is included in the analysis as a dichotomous variable.
Student calculus course in high school	This variable is entered into the model as a dichotomous variable.
Initial enrollment in a postsecondary STEM program	This variable is a dichotomous variable with a value of 1 for enrollment in a community college or a senior college.
No. of undergraduate calculus courses completed	This interval variable is a count of the number of calculus (or higher math) courses completed during undergraduate study.
No. of undergraduate science and engineering courses	This interval variable is a count of the number of science, engineering, and technology courses completed during the undergraduate years.
An undergraduate degree in a STEM field	This dichotomous variable indicates whether each individual earned a baccalaureate degree in a STEM field.
A graduate or professional degree in a STEM field	This dichotomous variable indicates whether each student earned a graduate or professional degree in a STEM field.
Employment in a STEM profession	This dichotomous variable is a measure of employment in a STEM profession 13 to 17 years after high school graduation.

Note. STEM = science, technology, engineering, mathematics, and medicine; GED = General Educational Development; PSE = postsecondary educational institutions; LSAY = Longitudinal Study of American Youth; NCES = National Center for Education Statistics; IRT = item response theory.

Pathways to an Engineering Career

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Utilizing data from the 20-year record of the Longitudinal Study of American Youth (LSAY), this analysis uses a set of variables to predict employment in engineering for a national sample of adults aged 34 to 37. The LSAY is one of the longest longitudinal studies of the impact of secondary education and postsecondary education conducted in the United States. A structural equation model found that mathematics is a primary gateway to an engineering career, beginning with algebra track placement in Grades 7 and 8 and continuing through high school and college calculus courses. Home and family factors such as parent education and parent encouragement of science and mathematics during secondary school also enhanced the likelihood of a young adult becoming a professional engineer. In addition, young men were substantially more likely to become professional engineers than young women. Considering each of these factors, this article seeks to understand the varied pathways available to students interested in engineering careers.

For most of the last century, the United States and other industrial countries have viewed the number of young adults entering engineering careers as a major indicator of national standing and economic competitiveness (Wu, 2007). The National Academies' *Rising Above the Gathering Storm* (National Academy of Sciences, National Academy of Engineering, and Institute of Medicine, 2005, 2010) argues for the education of more and better engineers, and the National Science Board's (NSB's; 2010) biennial *Science and Engineering Indicators* reports routinely include the number of new engineers as an indicator of U.S. achievement. Without seeking to resolve the issue of exactly how many engineers are needed, there is a broad consensus that sustaining a healthy flow of capable young adults into engineering careers is important for the health of the economy (Duderstadt, 2008; National Academy of Engineering, 2004, 2005; National Academy of Engineering & National Research Council, 2005; National Research Council, 1999a, 1999b, 2001). In this analysis, we first describe the current flow of young adults into professional engineering and then seek to identify the factors that are associated with successful entry into the field.

We are not the first investigators to examine this issue, and we acknowledge the large and useful literature that exists. A complete summary of prior work is beyond the scope of this

analysis, but we acknowledge relevant work as we discuss current patterns and relevant variables related to this analysis.

This analysis is based on the cumulative record of the Longitudinal Study of American Youth (LSAY). A summary of the LSAY is provided by Miller and Kimmel (2012/*this issue*), and a complete description of the study and data is available at <http://www.lsay.org>.

THE FLOW OF YOUNG ADULTS INTO ENGINEERING

The educational and social science literature has documented the influence of parents on the formation of basic educational aspirations (Berger & Luckmann, 1966; Heppner & Scott, 2004; Whiston & Keller, 2004). Because of the pervasive influence of parents and home factors, there are substantial differences in initial reading readiness and skills among children when they reach formal schooling, and many of these differences persist throughout school and beyond (Oakes, 1985, 1990; Parsons, Adler, & Kaczala, 1982). In addition to language skills, parents also convey basic attitudes toward the value of education as a whole.

Parent encouragement of science and mathematics has been well documented in recent decades (see Miller & Kimmel, 2012/*this issue*). Anecdotes about parents buying LEGO sets for their infants in the hope that this early experience would stimulate an interest in science or engineering have their roots in real behaviors. Other parents use science museums, zoos, aquariums, and similar facilities to encourage their children to be interested in science and technology. The cumulative effect of this smörgasbörd of home and community resources supplements formal schooling, providing some children with a substantial advantage during their years of elementary and secondary schooling (NSB, 2010).

Is there evidence that these early events have any influence on the eventual selection and pursuit of a career in engineering? At the most basic level, the likelihood that a young adult will enter postsecondary study is closely related to the level of the parents' education (see Table 1). Nearly half of the children of parents without a high school diploma (or GED) never enroll in postsecondary education (PSE), compared to only 8% of the children of parents with a graduate or professional degree. Young adults who do not seek a baccalaureate will not become professional engineers.

Although the career preferences of high school students often change in college, we find it useful to look at the expected college major of high school students as one of the first steps toward a career in engineering. High school intentions are important because they may inform many of the decisions that a student will make in regard to the selection of classes and the level of effort that he or she will expend on specific courses and on academic work generally. Subsequent analyses will show that some of the high school students who expressed a preference for a career in engineering may migrate into other science, technology, engineering, mathematics, and medicine (STEMM) fields or non-STEMM fields, but very few students who planned to major in a field other than engineering later migrated into the field (Cross, 2001; Duderstadt, 2008). With this pattern in mind, we look at some of the factors related to the intended college major of high school seniors.

Although the level of parent educational attainment is strongly related to entrance into PSE (Chen, 2009), it is only weakly related to the selection of an engineering major in college. Approximately 9% of the children of college graduates plan to major in engineering, compared

TABLE 1
Distribution of Student Plans to Major in Engineering in Grade 12

	Expected College Major			No PSE	N
	Engineering	Other STEM	Non-STEM		
All LSAY respondents	7%	15%	56%	22%	3,539
Student gender					
Female	3	17	61	19	1,737
Male	11	13	51	25	1,802
Parent education					
Less than HS	3	5	45	47	233
HS graduate	6	12	53	29	1,614
Some college	7	17	56	20	492
Baccalaureate	10	17	62	11	634
Graduate or professional	8	20	64	8	544
Parent college push					
0 (low)	1	3	37	59	278
1	5	10	49	36	500
2	7	15	59	19	1,377
3	11	18	60	11	999
4-5 (high)	11	30	55	4	227
Parent science-math push					
0 (low)	2	9	52	37	577
1	5	9	60	26	541
2	6	11	60	23	675
3	6	14	62	18	950
4-5 (high)	16	26	45	13	796
Algebra track					
No algebra course in HS	1	2	34	63	361
Algebra I in Grades 10-12	3	11	57	29	957
Algebra I in Grade 9	8	19	61	13	1,631
Algebra I in Grade 8	18	22	56	4	461
Race/Ethnicity					
Hispanic American	6	10	52	32	288
African American	11	17	44	28	309
Asian American	15	27	56	2	117
Native American	8	8	51	33	49
Other American	7	15	57	21	2,574

Note. STEM = science, technology, engineering, mathematics, and medicine; PSE = postsecondary educational institutions; LSAY = Longitudinal Study of American Youth; HS = high school.

to 6% of parents without a baccalaureate (see Table 1). The LSAY data suggest that overt parent encouragement of college attendance and encouragement of science and mathematics are substantially more important factors. A measure of parent college push illustrates the power of parent encouragement. Compared to 11% of students whose parents strongly encouraged college attendance, only 1% of students who experienced low parent encouragement to attend college planned to enter a postsecondary program and major in engineering. Overt parental encouragement of science and mathematics was even more influential. Only 2% of students whose parents provided a low level of science and mathematics encouragement planned to major

in engineering in college, compared to 16% of the children of parents who provided strong math and science encouragement. In subsequent multivariate analyses, we examine the role of each of these kinds of parental encouragement, but it is clear that the cumulative impact of these factors will be significant.

Elementary and secondary schools provide important instruction in and early exposure to science and mathematics. Schools vary, however, in the scope and quality of their instruction (NSB, 2010; Taningco, Mathew, & Pachon, 2008). The selection of a school reflects a mix of parent, community, and economic factors, but some parents overtly seek high-quality schools for their children within their economic and geographic limits.

Within the school context, the two most important decision points occur at the initial study of algebra and the completion of a calculus course during high school (Chen, 2009; Kelly, 2009; NSB, 2010). In the late 1980s, when LSAY participants were in school, approximately 14% of students took their first algebra course in Grade 8 and 47% started algebra in Grade 9. Another 28% would take an initial algebra course in Grades 10 or 11. The sorting of students into algebra tracks constitutes the primary form of high school tracking in the United States. Eighteen percent of high school seniors who started algebra in eighth grade planned to major in engineering in college, compared to 8% of students who took 1st-year algebra in Grade 9 (see Table 1).

There are substantial differences by race and ethnicity in plans for an engineering major in college (see Table 1). Hispanic American, African American, and Native American students are significantly less likely to enroll in PSE (Higher Education Research Institute, 2010; Leggon & Pearson, 2009; National Science Foundation, 2009a, 2009b; Nettles & Millett, 1999). The small sample sizes for these groups in the LSAY make more detailed comparison perilous. From other analyses, we know that a substantial portion of the race and ethnicity differences shown in Table 1 are accounted for by differences in parent education, home resources, and differential school experiences.

Although high school juniors and seniors hold sincere expectations about their future college plans, a substantial literature documents significant slippage between intentions and actual PSE enrollment (Higher Education Research Institute, 2010; Mau, 2003; NSB, 2010; National Science Foundation, 2009b). The transition from high school to college is difficult for a number of reasons, but it is a very important gateway on the path to an engineering career.

Using most of the same variables that we employed to look at intended college major, we turn to a brief examination of the factors associated with PSE in an engineering program. Five percent of all LSAY students enrolled¹ in an engineering program after high school, a small drop from the 7% of high school seniors who expressed an intention to enroll in an engineering program (see Table 2).

An examination of the linkage between intended college major and actual enrollment shows the amount of slippage between intentions and actual enrollments. Only 43% of high school seniors who indicated that they intended to major in engineering initially enrolled in an engineering program. About 22% enrolled in another STEMM program, and 34% enrolled in a non-STEMM major. At the same time, only 3% of students who initially expressed an intention to major in a nonengineering field subsequently enrolled in engineering. This asymmetrical relationship

¹In most cases, the enrollment occurred the year following the completion of high school, but in some cases the student may have deferred initial enrollment for a variety of reasons, including military service. One of the advantages of a longitudinal study that spans a number of years is that we can examine the behavior of interest regardless of its timing.

TABLE 2
Student Enrollment in an Engineering Program

	PSE Enrollment			No PSE	N
	Engineering	Other STEMM	Non-STEMM		
All LSAY respondents	5%	20%	53%	22%	3,539
Student gender					
Female	2	21	58	19	1,737
Male	8	19	48	25	1,802
Parent education					
Less than HS	1	14	38	47	233
HS graduate	5	18	48	29	1,614
Some college	5	24	51	20	492
Baccalaureate	7	18	64	11	634
Graduate or professional	6	25	61	8	544
Parent college push					
0 (low)	1	12	29	58	278
1	3	14	47	36	500
2	5	21	55	19	1,377
3	8	23	58	11	999
4–5 (high)	6	27	62	5	227
Parent science-math push					
0 (low)	3	14	46	37	577
1	2	14	58	26	541
2	3	18	56	23	675
3	5	21	56	18	950
4–5 (high)	10	28	49	13	796
Algebra track					
No algebra course in HS	0	10	27	63	361
Algebra I in Grades 10–12	2	16	53	29	957
Algebra I in Grade 9	6	23	58	13	1,631
Algebra I in Grade 8	13	25	58	4	461
Intended college major in Grade 12					
Engineering	43	22	34	1	250
Other STEMM field	3	59	39	0	515
Non-STEMM field	3	17	80	0	1,989
Did not enter PSE	0	0	0	100	785

Note. PSE = postsecondary educational institutions; STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; HS = high school.

reflects the high mathematics requirement associated with admission to an engineering program; prospective engineering students may decide to use their math skills in other fields, but students without advanced math skills cannot major in engineering without substantial additional work (see Chen, 2009).

Most parental, family, and school factors associated with the intention to major in engineering were also associated with actual college enrollment. The level of parent education was largely unrelated to enrollment in an engineering program, but the level of parent college push was related to enrollment in an engineering program. The level of parent encouragement of science and mathematics had an even stronger correlation with enrollment in an engineering program.

And, for the reasons discussed earlier, algebra track placement was very strongly related to enrollment in an engineering program (see Table 2).

The bivariate relationships shown in Tables 1 and 2 provide a general sense of the structure of a student's precollege life, and they suggest some ways in which these factors influence the selection of an initial career path. The examination of each of these factors in separate tables is interesting, but these factors occur simultaneously in the life of a student. It is necessary to estimate the relative influence of precollege factors seeking to analyze college and young adult experiences that may influence completion of an engineering degree and entrance into an engineering career. Following the logic outlined by Miller and Kimmel (2012/*this issue*), this analysis utilizes a structural equation model (SEM) to predict initial enrollment in an engineering program.

A PATH MODEL TO PREDICT INITIAL ENROLLMENT IN AN ENGINEERING PROGRAM

As discussed in the article by Miller and Kimmel, a structural equation path model helps us estimate the relative influence of each factor in models that include several factors. Miller and Kimmel's article provides a clear breakdown of the logic behind a SEM, but in general terms a SEM is a set of regression equations that predict each variable in the model and take advantage of our knowledge about the chronological or logical order of the variables. Look to Miller and Kimmel's article for a further breakdown of this method.

To understand the relative impact of selected variables on enrollment in an engineering program, we constructed a relatively simple path model (see Figure 1). Because influence and causation flow from left to right in a path model, the variables on the left side of the model are presumed to precede variables to their right either chronologically or logically. A detailed description of the construction of the major independent variables was provided in Miller and Kimmel (2012/*this issue*) and need not be repeated. The model was estimated using LISREL 9.0 (Hayduk, 1987; Jöreskog & Sörbom, 1993).

The results show that there is a relationship (represented by an arrow and called a path) from parent education to parent science-math push, with a path coefficient² of 0.30 (see Figure 1). This path and coefficient indicate that parents with higher levels of education were more likely to encourage their child to do well in science and mathematics during that child's high school years than parents with lower levels of education. The path from gender to parent science and math push (0.11) means that LSAY parents provided slightly more encouragement to their sons to study science and mathematics than they provided for their daughters. This finding holds constant the level of parent education and parent employment in a STEMM field (Hayduk, 1987). While holding constant parent education and student gender, we can see the absence of a path from parent employment in a STEMM field to parent science and math push. This indicates that parents who work in a STEMM field did not provide significantly more encouragement to their child to study science and mathematics than parents not employed in a STEMM job. These socialization behaviors are consistent with earlier studies by Parsons, Ruble, Hodges, and Small (1976).

²All of the paths shown in the model are significant at the .05 level or better.

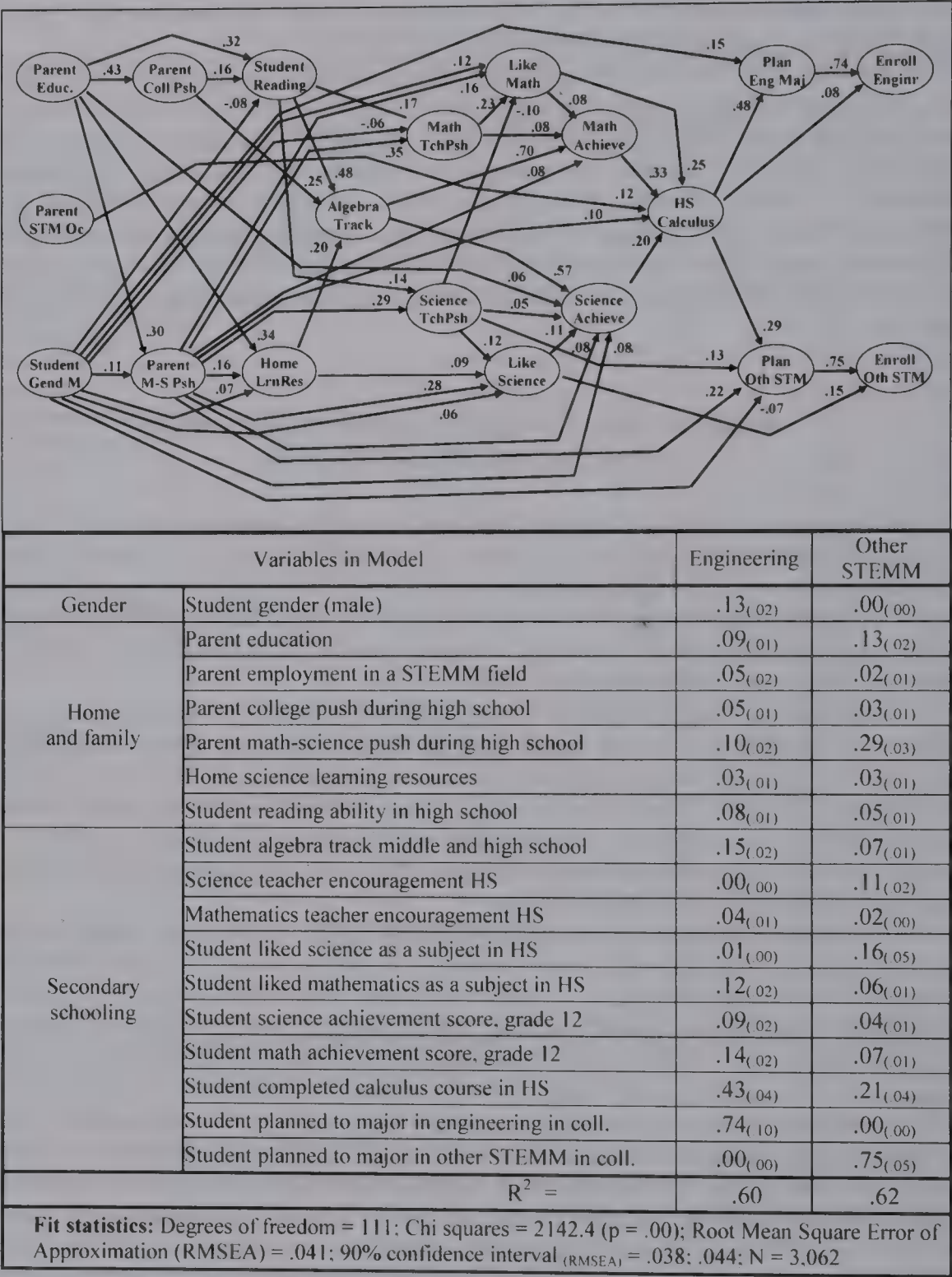


FIGURE 1 A path model to predict enrollment in an engineering program.

In this analysis of precollege factors, we examined the full LSAY participant population using 3,062 young adults³ who had data for each of the independent variables and the two outcome variables in the model. We included all of the students in this analysis in order to obtain accurate estimates of the influence of family and school factors. When we turn to an analysis of factors that occurred during PSE, we include only those students who enrolled in some form of PSE to obtain a more accurate estimate of college and other postsecondary effects.

The path model in Figure 1 demonstrates that a complex combination of factors contribute to each individual's decision to enroll in a postsecondary engineering program. Our analytic task is to identify the factors that cause some LSAY students to enroll in an engineering program and to estimate the relative strength of each of those factors.

An examination of the numerous paths in Figure 1 would reveal many interesting insights into the interaction of the variables included in this analysis, but one of the advantages of using SEM is that it provides accurate summary measures of the *total effect* of each of the variables in the analysis. Some variables in this model have a combination of positive and negative effects, and the total effect is the net effect of the variable on our outcome variable—enrolling in an engineering program. For example, the data in Figure 1 show that the parents of LSAY students provided both more encouragement and more home learning resources for their sons than their daughters. High schools girls, however, tended to have higher reading scores than high school boys, which provided numerous advantages in school programs. When these advantages and disadvantages were combined, and controlling for the other factors that occurred during the secondary school years, the results showed that male students were more likely to enroll in engineering programs than female students, with a total effect of 0.13 (see Figure 1). In contrast, there is no gender difference in terms of the likelihood of male and female students enrolling in other PSE STEMM programs. This result is consistent with our observations of the enrollment data from Table 2, but it provides a more accurate estimate of the net effect of gender on engineering enrollment when we hold constant a wide range of other factors. For clarity and simplicity, this initial analysis focuses on the total effects found in this precollege model.

In our examination of the total effects of the variables included in our model, the importance of early algebra and a strong math program (including the completion of a calculus course in high school) appeared as key factors in predicting enrollment in engineering (see Figure 1). Early enrollment in algebra provided an initial advantage (total effect = 0.15), which was linked with a positive student attitude toward mathematics (0.12) and higher levels of achievement in subsequent mathematics courses (0.14). The result of this sequence is the completion of a calculus course in high school, which had a total effect of 0.43 (see total effects table in Figure 1). These factors (in addition to parental encouragement) appeared to lead to a student's intention to enroll in engineering, and this intention may have influenced a wide array of other choices and activities during the high school years. The total effect of planning to enter engineering (0.74) illustrates the importance of early career decisions on subsequent enrollment decisions and behaviors.

We would like to note briefly some of the factors that did not predict enrollment in a PSE engineering program. Parent employment in a STEMM field was weakly related to enrollment in an engineering program (0.05), discounting the idea that the children of scientists and engineers follow their parents' choices in large numbers. The legendary influence of LEGO sets and other

³The cases included in this analysis are weighted to reflect the original student population in the study.

home science learning resources had minimal effect on enrollment (0.03). Similarly, encouragement from science or mathematics teachers appeared to have little impact on actual enrollment decisions. A positive attitude toward mathematics had a moderate influence on enrollment in an engineering program (0.12), but a student's interest in science did not (0.01). Student achievement in science (0.09) had less influence on engineering enrollment than success in high school mathematics.

The precollege model accounted for 60% of the total variance in enrollment in a PSE engineering program (see note in Figure 1). As demonstrated by the fit statistics, this is a good fitting model.

A PATH MODEL TO PREDICT THE COMPLETION OF A BACCALAUREATE IN ENGINEERING

The initial analysis examined factors associated with entrance into a PSE engineering program, which is an essential entry point on the path to employment as a professional engineer. The second step in that process is the completion of a baccalaureate degree in engineering. We thus seek to identify the major factors associated with completion of an engineering baccalaureate. We have expanded our initial model to include the number of college calculus courses and the number of college science courses completed during the undergraduate years. We also add two new outcome variables—the completion of an engineering baccalaureate and the completion of a baccalaureate in another STEMM field. Although our primary focus in this analysis is the pathways into professional engineering, comparative information about the pathways to other STEMM baccalaureate degrees is instructive.

For this examination of the factors related to the completion of a baccalaureate in engineering, we limited our population to those students who had enrolled in either a community college or a senior college. As observed in Tables 1 and 2, approximately 78% of LSAY participants had enrolled in a PSE institution. It would have been inappropriate to include students who had never entered PSE in an analysis of the impact of college calculus courses, for example.

Among the PSE population, young men were 7 times more likely to earn a baccalaureate in engineering than were young women, although young women who entered PSE were more likely to complete a baccalaureate than were young men (see Table 3). Students whose parents strongly encouraged college attendance were slightly more likely to complete an engineering baccalaureate than students whose parents provided lower levels of college encouragement. Parent encouragement of science and mathematics during the middle school and high school years was positively associated with the completion of an engineering baccalaureate. And student enrollment in eighth-grade algebra continued to be a major predictor for the completion of a baccalaureate in engineering.

At the university level, the number of calculus courses completed during college was strongly related to the completion of an engineering baccalaureate. The completion of one or more college calculus courses was strongly associated with all STEMM fields (Chen, 2009). This partly explains the importance of eighth-grade algebra and 12th-grade calculus during the secondary school years.

To assess the importance of both precollege and college factors on the completion of an engineering baccalaureate, we will utilize our extended path model (see Figure 2). We focus our analysis on the total effects of the variables in the model (see total effects table in Figure 2).

TABLE 3
Student Completion of a BS in Engineering

	Earned Baccalaureate in ...			Did Not Complete	N
	Engineering	Other STEMM	Non-STEMM		
All LSAY respondents	4%	13%	39%	44%	2,752 ^a
Student gender					
Female	1	15	42	42	1,403
Male	7	12	35	46	1,349
Parent education					
Less than HS	0	5	26	69	124
HS graduate	3	9	32	56	1,155
Some college	3	12	33	52	394
Baccalaureate	6	17	51	26	566
Graduate or professional	5	23	49	23	504
Parent college push					
0 (low)	2	4	21	73	115
1	1	6	28	65	322
2	3	12	38	47	1,116
3	6	16	47	31	889
4–5 (high)	4	26	47	23	214
Parent science-math push					
0 (low)	2	7	34	57	364
1	1	9	39	51	398
2	3	12	39	46	516
3	3	13	41	43	779
4–5 (high)	9	20	39	32	693
Algebra track					
No algebra course in HS	0	2	13	85	134
Algebra I in Grades 10–12	1	5	27	67	677
Algebra I in Grade 9	4	16	44	36	1,420
Algebra I in Grade 8	10	21	50	19	441
No. of college calculus courses completed					
None	1	8	37	54	1,848
1 or 2 courses	2	24	53	21	573
3 or more courses	33	29	29	9	249

Note. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; HS = high school.

^aThis table includes only respondents who enrolled in postsecondary education at the community college or senior college level. *N* = 2,752.

When predicting the completion of an engineering baccalaureate, and holding constant the other factors in the model, the influence of gender remained strong, with a total effect of 0.15, indicating that men were more likely to complete an engineering baccalaureate than women. Women were slightly more likely to complete a baccalaureate in nonengineering STEMM fields (−0.08) than men when all other things were held equal. We return to this issue in our closing discussion.

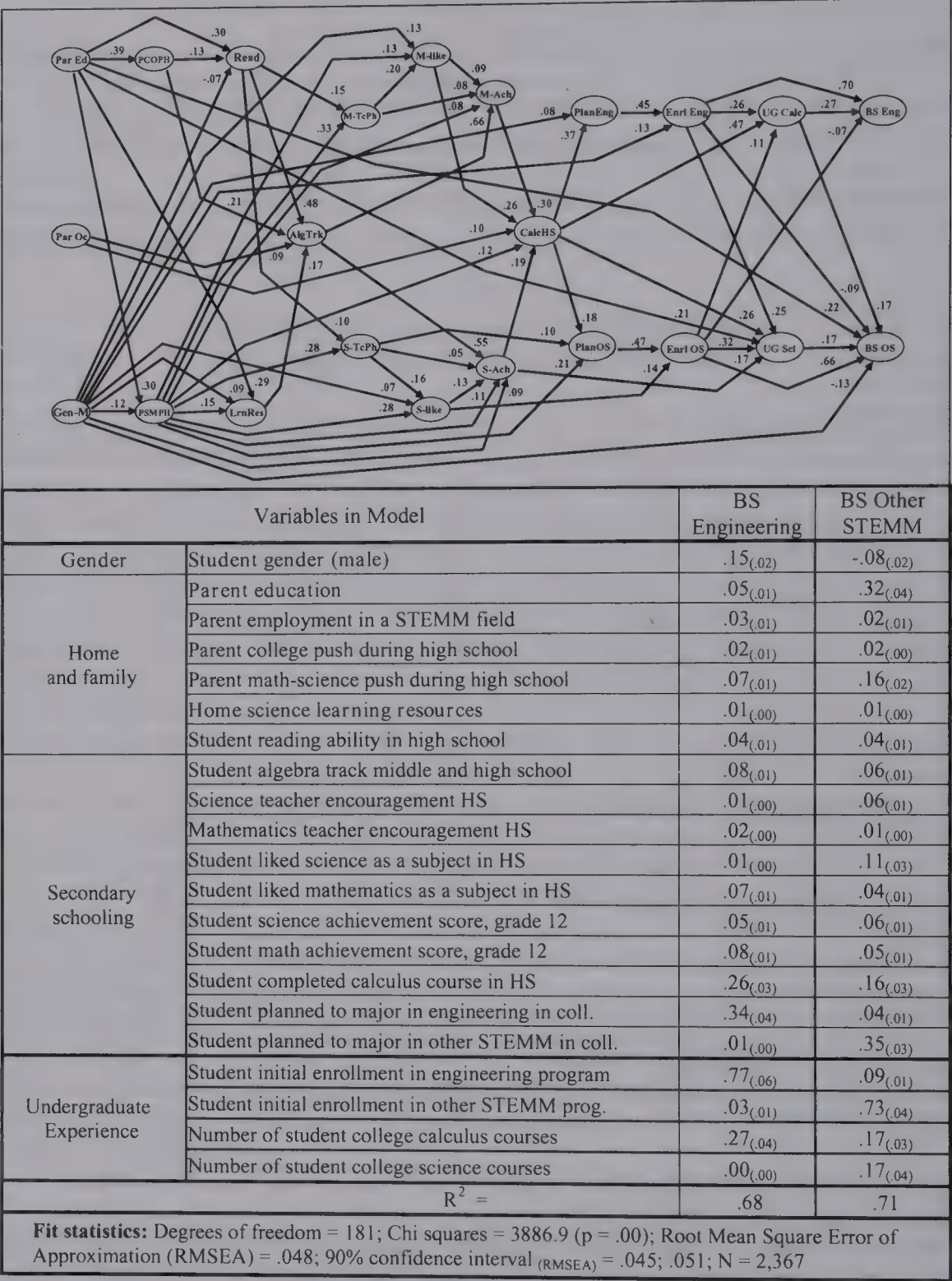


FIGURE 2 A model to predict completion of a BS in engineering.

Several family and home variables continued to exercise an influence on the completion of an engineering baccalaureate, including parent education (0.05) and parent math-science push (0.07). Algebra track assignment had a positive effect (0.08) on the completion of an engineering baccalaureate as did high school achievement in science (0.05) and mathematics (0.08), but the completion of a high school calculus course remained the strongest precollege predictor of the successful completion of an engineering baccalaureate (0.26; see Figure 1). The strength of these factors declined over the years after high school, but they were never completely replaced by post-high school experiences.

Reflecting its gatekeeper role, initial enrollment in a PSE engineering program had a strong postsecondary influence, with a total effect of 0.77. The number of college calculus courses positively related to the completion of an engineering baccalaureate (0.27), but the number of college science courses proved unrelated to the completion of an engineering baccalaureate. In broad terms, these results point to the structured nature of undergraduate engineering education. The completion of specific requirements is essential to a degree and position in the engineering field.

This postsecondary model accounted for 68% of the total covariance in the completion of a baccalaureate in engineering. The other fit statistics suggest that this is a good fitting model.

ENTRY INTO THE ENGINEERING PROFESSION

Having examined initial enrollment in an engineering program and subsequent completion of a baccalaureate in professional engineering, we turn to an examination of actual employment and work in the field. Most professional engineers enter the workforce with a baccalaureate degree and continue to work without additional graduate or postgraduate degrees. In addition, some individuals with an engineering baccalaureate enter professions and occupations other than engineering.

Examining the LSAY cohorts, 58% of engineering baccalaureates have entered the profession and are working as engineers. An additional 12% of engineering baccalaureates have entered other STEMM occupations (medicine or health are most common). Approximately 70% of engineering baccalaureates are employed in the STEMM professional workforce currently. Approximately 20% of engineering graduates report that they have found employment in businesses and other occupations that are not directly involved in engineering, although their engineering education may aid to them in their current work. The remaining 10% have moved into other fields or are out of the workforce for various reasons.

DISCUSSION

This analysis demonstrates that the pathways to an engineering career are long and complex, as Super (1957, 1980; Super & Bowlsbey, 1979) and Krumboltz (1976) suggested they would be. To become a professional engineer, a student must successfully negotiate a series of educational gates over a period of years while sustaining interest and focus. Too often, cross-sectional studies have focused on short-term influences, but this longitudinal record indicates that many factors have early roots and long-term impact (Paa & McWhirter, 2000; Turner & Lapan, 2002).

Secondary school tracking is an early factor that significantly influences a number of outcomes. Although tracking begins in elementary school, the best single indicator of track placement relative to engineering is the year in which a student first takes algebra. Students who begin algebra in Grade 7 or 8 have a substantial advantage throughout secondary school. In this model, algebra track placement was the strongest predictor of both mathematics achievement and science achievement. Students who did not begin algebra until Grade 9 were significantly less likely to complete a calculus course in high school and, in turn, less likely to enter or complete a baccalaureate in engineering. Unfortunately, this critical decision point continues to be largely invisible to many students and parents. Despite the strong recommendation of the National Council of Teachers of Mathematics more than 20 years ago that a majority of students should begin algebra in Grade 7 or 8, there has been limited progress in this area.

The main message of this model is that mathematics is the gateway to an engineering career. The completion of a calculus course in high school and the number of college calculus courses taken were two of the strongest predictors of the completion of an engineering baccalaureate degree. Math, then, remains the definitive gateway into engineering education and, ultimately, into the engineering profession.

This model also points to the importance of degree completion at the baccalaureate level. Nearly one third of students who enter a PSE engineering program fail to complete a baccalaureate in any field. We recognize that students will change their thinking about career choices during their college years and think that this is generally a healthy process that enhances the fit between education and one's life work, but we are disappointed with the high level of noncompletion at the PSE level. In a flat and competitive world, dropping out of PSE has serious economic consequences that are often difficult to overcome in later years.

This model indicates that a student's interest in an engineering career during high school is an important factor in both initial enrollment and completion of an engineering baccalaureate. Our description of the variable—an intention to major in engineering in college—may understate the importance of the attitudes and behaviors implied by this variable. Student career plans during high school are important in that they inform the student and the parents about the kind of courses and education that will be necessary for the attainment of this goal. Most students and school counselors recognize that mathematics—and, specifically, calculus—is necessary for success in engineering. The earlier that a student adopts a career target, the more choices he or she can make about courses in school and supplemental activities out of school. Students who begin algebra in Grade 10 or later have virtually no chance of obtaining entry into a baccalaureate engineering program without extensive remedial work in mathematics. Although a late decision to seek entrance into an engineering program does impact other areas' curriculum, the impact on mathematics course selection can be catastrophic.

Finally, this model points to the continuing importance of gender in understanding successful entrance into an engineering career, as it identifies several points at which gender is an important influence, beginning with parental attitudes and encouragement. High school boys report slightly more parental encouragement to study science and mathematics than girls (0.11), but high school girls—perhaps with parental encouragement and attention—score higher on reading tests. Female students are also more likely to earn a baccalaureate than male students. Despite these findings, and considering all of the positive and negative pathways, male LSAY participants were significantly more likely to both enter a postsecondary engineering program and earn an

engineering baccalaureate than were female participants (0.13). The continuing gender disparity in the professional engineering workforce is and should be a subject of national concern.

AUTHOR BIOS

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Pathways to Careers in Medicine and Health

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Physicians and other health professionals are an important part of the national scientific and technical workforce, and it is important to understand the factors that attract (or fail to attract) young adults into these fields. Using data from the 20-year record of the Longitudinal Study of American Youth (LSAY) and working within a social learning paradigm, this analysis uses a set of variables to predict employment in medicine or other health professions for a national sample of young adults aged 36 to 39. The LSAY is one of the longest longitudinal studies of the impact of secondary education and postsecondary education conducted in the United States. A structural equation model found that early home and parental factors provided substantial encouragement toward a career in medicine or health but that the net impact of these early advantages was slightly less for medicine and health than for other STEMM professions. Early school success and early algebra and calculus enrollment were important factors in eventual entrance into medicine or other health professions, but more as gatekeepers than as programmatic factors. Although twice as many young women earned premedical or prehealth professional degrees than young men, twice as many young men eventually entered medicine or another health profession as young women.

Physicians and other health professionals are held in high esteem by most Americans and play a critical role in the health care system. For decades, national surveys conducted by the General Social Survey and by the Gallup Organization have found that Americans report a high level of confidence in physicians, often higher than elected officials or the leaders of major organizations. Recent national assessments of the scientific workforce in the United States have recognized that physicians and other health professions are important members of the scientific community and workforce.

This analysis describes both the factors that lead American young adults to plan for a medical or health career and the factors that predict successful entrance into professional employment in a medical or health field. For the purpose of this article, medical and health professionals are defined to include physicians, dentists, veterinarians, and nurses with a master's degree or higher. This definition distinguishes between these professional classifications and health and medical support positions, which include laboratory technicians, therapists, radiology and other

technicians, as well as nurses with less than a master's degree (Miller & Solberg, 2012/this issue). These definitions were developed in conjunction with the construction of parallel definitions for professional and support positions in science, engineering, mathematics, and related technological areas. In broad terms, science, technology, engineering, mathematics, and medicine (STEMM) professionals exercise individual and group judgment about scientific or technical decisions, whereas STEMM support occupations tend to carry out the instructions and procedures set by STEMM professionals. This analysis focuses on only physicians and other health professionals; other analyses look at medical and health support occupations.

The pathways to a career in health or medicine are long and require successful negotiations with numerous gatekeepers over several years. Yet, like the pathways into other STEMM careers, the original motivation begins in the home and in precollege schooling experiences. Using the 20-year record from the Longitudinal Study of American Youth (LSAY), this analysis first looks at the precollege years and seeks to identify the factors that predict a strong interest in and plans for a career in medicine or health. This initial analysis seeks to identify the relative influence of parental, home, and school factors in developing a strong interest in a medical or health career and the factors that predict academic achievement sufficient to make this a realistic aspiration.

A second analysis builds on the first model and seeks to identify additional factors that predict success in the completion of baccalaureate degree appropriate to a medical or health career at the professional level and the successful entrance into that field. Although the initial precollege analysis included all students in the LSAY national sample, the second analysis examines only students who enrolled in a postsecondary education (PSE) program—at a community college or a senior college—at some time after the completion of high school. By building on the precollege model, we can examine the continuing impact of precollege home and school advantages (or disadvantages); the continuing impact of course and program choices made during the college years; and, in many cases, the continuing impact of graduate school or professional programs.

This analysis is based on the cumulative record of the LSAY (see Miller & Kimmel, 2012/this issue, for a description of the LSAY sample and structure). Additional information about the history and current status of the LSAY can be found at <http://www.lsay.org>.

THE FLOW OF YOUNG ADULTS INTO MEDICAL AND HEALTH PROFESSIONAL CAREERS

Like other STEMM fields, the pathway to a professional career in medicine or other health profession begins at home (Berger & Luckmann, 1966; Heppner & Scott, 2004; Whiston & Keller, 2004). Medicine and the health professions are a special case in regard to early occupational socialization. Most young children see physicians and nurses throughout their childhood and adolescent years. These figures can then become role models. Adolescents see television drama series that portray emergency, forensic, and other kinds of medical practice as exciting, challenging, and rewarding. Some of this initial interest may transfer to other STEMM interests during the college years, but for other young people these early experiences become the initial stimulus in a long series of other stimuli and events that point to a career in medicine or another health profession.

There is substantial evidence supporting the broad impact of these early parental and home factors on the eventual selection and pursuit of a career in medicine or another health profession

(Davis-Kean, 2005) The data from the LSAY provide a timely confirmation of the pervasive influence of parents on the career decisions of their children.

Although the career preferences of high school students often change in college and during young adulthood, the expected college major of high school students stands as one of the first steps toward a career in medicine and health. High school intentions are important because they inform—in part—many of the decisions that a student will make about course selection and the level of effort that he or she will expend on academic work. Subsequent analyses show that some of the high school students who express a preference for a career in medicine and health may migrate into other STEMM fields or non-STEMM fields but very few students who plan to major in a field appropriate to medicine or health will migrate into these careers later.

Although the level of parent educational attainment is strongly related to entrance into post-secondary study, it is only weakly related to the selection of a career in medicine or health. Approximately 13% of the children of college graduates plan to major in a field that would lead to medicine or another health profession, compared to 10% of students of parents without a baccalaureate (see Table 1). The LSAY data suggest that overt parent encouragement of college attendance and encouragement of science and mathematics are substantially more important factors. A measure of parent college push illustrates the power of parent encouragement. Only 3% of students who experienced low parent encouragement to attend college planned to enter a postsecondary program and major in a premedical or prehealth professional field, compared to 24% of students whose parents strongly encouraged college attendance. Overt parental encouragement of science and mathematics proved equally influential. Only 7% of students whose parents provided a low level of science and mathematics encouragement planned to major in a college field that would lead to a medical or health career, compared to 19% of the children of parents who provided strong math and science encouragement.

Elementary and secondary schools provide important instruction in and early exposures to science and mathematics. Within the school context, there are some important decision points. One of the most important is the timing of the initial study of algebra and the eventual completion of a calculus course during high school. In the late 1980s, approximately 13% of students took their first algebra course in Grade 8, and 46% started algebra in Grade 9. The timing of this first algebra course is important because the hierarchical structure of mathematics instruction makes it difficult for students who do not begin algebra in Grade 8 to complete calculus by Grade 12. In practice, students who do not take algebra in Grade 8 or 9 are significantly less likely to enter PSE or to earn a baccalaureate.

We note that there are some differences by race and ethnicity in plans to prepare for a professional career in medicine or health in college (see Table 1). As other studies have found, Hispanic American, African American, and Native American students were significantly less likely to enroll in PSE at all, and the small sample sizes for these groups make other comparisons perilous. From other multivariate analyses, we know that a substantial portion of the race and ethnicity differences shown in Table 1 are accounted for by differences in parent education, home resources, and differential school experiences. Because of these limitations, we are not able to provide a separate analysis of the impact of race and ethnicity on the selection of a medical or health career, but we feel obligated to note the disparities shown in Table 1.

Although high school juniors and seniors hold sincere expectations about their future college plans, substantial literature documents significant slippage between intentions and actual PSE

TABLE 1
Distribution of Student Plans to Major in Premedicine or Health in Grade 12

	Expected College Major ^a			No PSE	N
	Premed Health	Other STEMM	Non-STEMM		
All LSAY respondents	11%	13%	56%	22%	3,539
Student gender					
Female	14	8	61	19	1,737
Male	8	18	51	25	1,802
Parent education					
Less than HS	5	4	45	47	233
HS graduate	10	10	53	29	1,614
Some college	12	13	56	20	492
Baccalaureate	12	19	62	11	634
Graduate or professional	15	18	64	8	544
Parent college push					
0 (low)	3	2	37	58	278
1	7	9	49	36	500
2	12	12	59	19	1,377
3	13	19	60	11	999
4–5 (high)	24	28	55	4	227
Parent science-math push					
0 (low)	7	5	51	37	577
1	6	8	61	26	541
2	9	8	62	23	675
3	11	12	62	18	950
4–5 (high)	19	29	44	13	796
Algebra track					
No algebra course in HS	2	1	34	63	361
Algebra I in Grades 10–12	9	6	57	29	957
Algebra I in Grade 9	14	16	60	13	1,631
Algebra I in Grade 8	15	32	56	4	461
Race/Ethnicity					
Hispanic American	9	8	52	32	288
African American	13	17	44	28	309
Asian American	21	28	56	2	117
Other American	11	13	57	21	2,574

Note. STEMM = science, technology, engineering, mathematics, and medicine; PSE = postsecondary education; LSAY = Longitudinal Study of American Youth; HS = high school.

^aPercentages may not total to 100% because of overlapping major fields such as biology.

enrollment. In the broader framework of adolescent socialization and development, this is not surprising. The transition from high school into college is difficult and may involve the disruption of social networks and close personal relationships, but it is an essential gateway on the path to a career in medicine or health.

Using the same variables we employed to look at intended college major, we turn to an examination of the factors associated with PSE enrollment in a preparatory program for medicine

TABLE 2
Student Enrollment in a Premed or Health PSE Program

	PSE Enrollment ^a			No PSE	N
	Premed Health	Other STEMM	Non-STEMM		
All LSAY respondents	10%	16%	53%	22%	3,539
Student gender					
Female	15	8	59	19	1,737
Male	6	22	48	25	1,802
Parent education					
Less than HS	9	6	38	47	233
HS graduate	10	13	48	29	1,614
Some college	13	16	52	20	492
Baccalaureate	8	18	64	11	634
Graduate or professional	9	23	60	8	544
Parent college push					
0 (low)	5	7	29	59	278
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3	10	16	56	18	950
4–5 (high)	12	27	49	13	796
Algebra track					
No algebra course in HS	6	5	27	62	361
Algebra I in Grades 10–12	9	9	53	29	957
Algebra I in Grade 9	12	18	58	13	1,631
Algebra I in Grade 8	9	31	57	4	461
Intended College Major in Grade 12					
Premed/Health	40	18	42	0	250
Other STEMM Field	11	56	45	0	515
Non-STEMM Field	8	12	80	0	1,989
Did not enter PSE	0	0	0	100	785

Note. PSE = postsecondary education; STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; HS = high school.

^aPercentages may not total to 100% because of overlapping major fields such as biology.

or health at the professional level. Ten percent of all LSAY students matriculated¹ to a PSE program designed to prepare them for the graduate or professional training necessary for a medical or other health career—essentially the same as the 11% of high school seniors who expressed an intention to enroll in a premed or prehealth profession program (see Table 2).

¹In most cases, the enrollment occurred the year following the completion of high school, but in some cases the student may have deferred initial enrollment for a variety of reasons, including military service. One of the advantages of a longitudinal study that spans a number of years is that we can examine the behavior of interest regardless of its timing.

An examination of the linkage between intended college major and actual enrollment shows the amount of change between intentions and actual enrollments. Only 40% of high school seniors who indicated that they had intended to major in a premed or prehealth professional program in college eventually enrolled in such a program (see Table 2). About 18% enrolled in another STEMM program, and 42% enrolled in a non-STEMM major. At the same time, 11% of students who initially expressed an intention to major in another STEMM field enrolled in a PSE program to prepare for a medical or health career.

Most of the parental, family, and school factors associated with the intention to major in medicine or health were associated with actual enrollment. The level of parent education was largely unrelated to enrollment in a medical or health preparatory program, but the level of parent college push and the level of parent encouragement of science and mathematics were positively related to enrollment in premed or prehealth professional programs (see Table 2).

The bivariate relationships shown in Tables 1 and 2 provide a general sense of the structure of the precollege life experiences and suggest some of the ways in which these factors influence the selection of an initial career path. Although we can look at each of these factors in separate tables, they occur simultaneously in the life of a student or young adult. Estimating the relative influence of these precollege factors is conceptually and analytically important before turning to an analysis of college and young adult experiences that may influence final entrance into a medical or health career. For this purpose, we utilize a structural equation model to predict initial enrollment in medical or health profession preparation programs. The same model also predicts initial enrollment in other STEMM programs to provide a comparative context for thinking about the factors related to medical and health enrollment. We include the full LSAY population in this analysis so that the results are applicable to all precollege students.

A PATH MODEL TO PREDICT INITIAL ENROLLMENT IN PREMED OR PREHEALTH PROGRAMS

A structural equation path model is a useful device for estimating the relative influence of each factor in models that include several. In broad terms, a structural equation model is a set of regression equations that predict each variable in the model and take advantage of our knowledge about the chronological or logical order of those variables.²

To understand the relative impact of several important family and school variables during the precollege years, we have constructed a relatively simple path model³ (see Figure 1). A detailed discussion of the major independent variables was provided by Miller and Kimmel (2012/*this issue*) and does not need to be repeated. The model was estimated using LISREL 9.0 (Hayduk, 1987; Jöreskog & Sörbom, 1993).

This analysis of precollege factors includes the full LSAY participant population of 3,664 young adults who had data for each of the independent variables and the two outcome variables in the model. The full population of students is included in this analysis in order to obtain accurate

²For a discussion of the advantages of structural equation models relative to ordinary least squares regression, see Hayduk (1987).

³Readers not familiar with this method may wish to consult Miller and Kimmel (2012/*this issue*) for a summary introductory discussion.

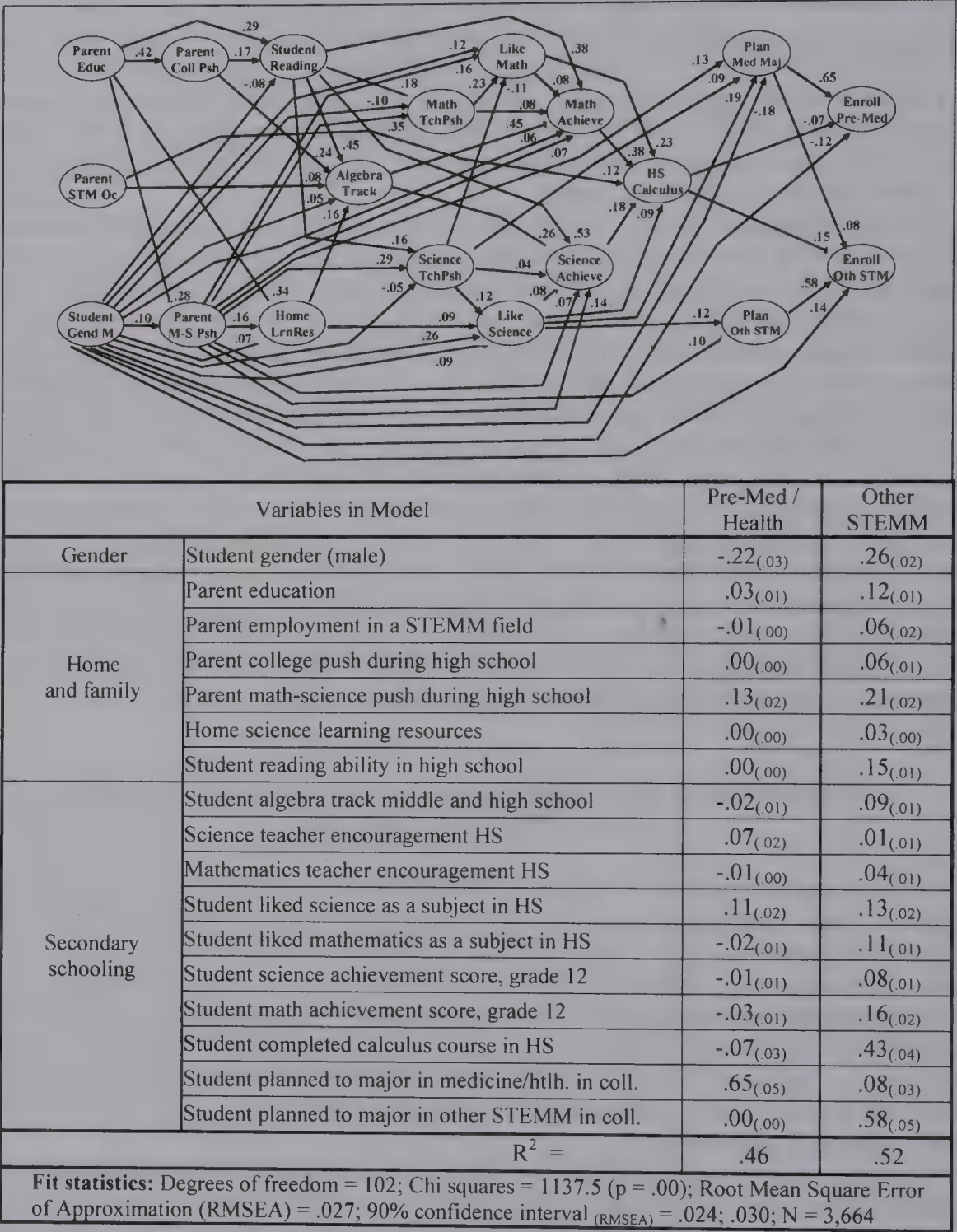


FIGURE 1 A path model to predict enrollment in a premed or health program.

estimates of the influence of family and school factors. When we turn to an examination of factors that occurred primarily during postsecondary education, the analysis includes only those students who enrolled in postsecondary study to obtain a more accurate estimate of college and other postsecondary effects on the PSE population.

The path model in Figure 1 demonstrates that a complex combination of factors contributed to each individual's decision to enroll in a postsecondary program to prepare for a career in medicine or health (or enrollment in a nonhealth STEMM program). Our analytic task is to identify and estimate the factors that cause some LSAY students to enroll in a medical or health preparatory program and others to make different choices.

Looking at the total effects of the variables included in our model, the major predictor of enrollment in a postsecondary program was a student's intention to enroll in a health or medical program during high school (0.65). The relatively strong influence of parents during the secondary school years (0.13 for medicine/health) supports the early socialization hypothesis.

An examination of adolescent plans for a medical or health profession compared to other STEMM professions provides some useful insights into the career selection process. The substantial influence of mathematics—especially calculus—on initial enrollment in a STEMM program in science or engineering is shown in the paths and total effects in Figure 1. The total effect of taking a calculus course in high school on the likelihood of enrolling in a nonhealth STEMM postsecondary program was 0.43, but the total effect of a high school calculus course on initial enrollment in a health or medical preparatory program was -0.07 (see Figure 1). Initial algebra track placement was not significantly related to initial enrollment in a premedical or prehealth professional program and student achievement in high school science and mathematics was unrelated to initial enrollment in a medical or health preparatory program.

Illustrating the asymmetrical relationship between plans for a medical or health profession and plans for other STEMM professions, student plans for a medical or health profession during high school had a small positive relationship (0.08) to initial enrollment in another STEMM field, but high school plans to enroll in other STEMM fields was unrelated to initial enrollment in a medical or health preparatory program. This result is consistent with our previous observation that some students who begin preparation for a medical or health career migrate into other STEMM fields but that few students who begin in other areas of science or engineering subsequently migrate into medicine or health.

The precollege model accounted for 46% of the total covariance in enrollment in a postsecondary program to prepare for a career in medicine or health, compared to 52% of the total covariance in initial enrollment in other STEMM programs. The fit statistics at the bottom of Figure 1 indicate that this is a good fitting model.

A PATH MODEL TO PREDICT EMPLOYMENT IN MEDICAL AND HEALTH PROFESSIONS

The preceding analysis looked at the factors associated with enrollment in a postsecondary program to prepare for a medical or health profession. Having obtained some understanding of the factors that help form initial interests and plans, we turn to an analysis of the factors that predict successful entrance into a medical or other health profession.

For this analysis, we extended our previous model to include the number of college calculus courses and the number of college science courses completed during the undergraduate years (see Figure 2). We also added new variables to mark the completion of a baccalaureate program that is preparatory for a medical or health profession and a measure of employment in medicine or other health profession.

Looking at the composition of the young adults included in the medical and health professions in this analysis, we see that the LSAY includes individuals working in a wide range of medical and health professions. Of the 60 LSAY respondents currently employed in a medical or health profession, 26 are physicians, 11 are pharmacists, four are veterinarians, four are physician assistants or nurse practitioners, three are dentists, three are clinical psychologists, three are nurses, and two are optometrists. It is important to keep this diversity of professions and occupations in mind when thinking about the factors that predict employment in one of these roles.

To examine the factors related to entrance into a medical or other health profession, we focus on only those students who enrolled in a postsecondary program in community college or senior college in any field. By limiting the population to young adults who tried PSE, we can estimate the relative influence of various factors more accurately than we could if we retained the nearly 900 LSAY respondents who did not enter PSE.

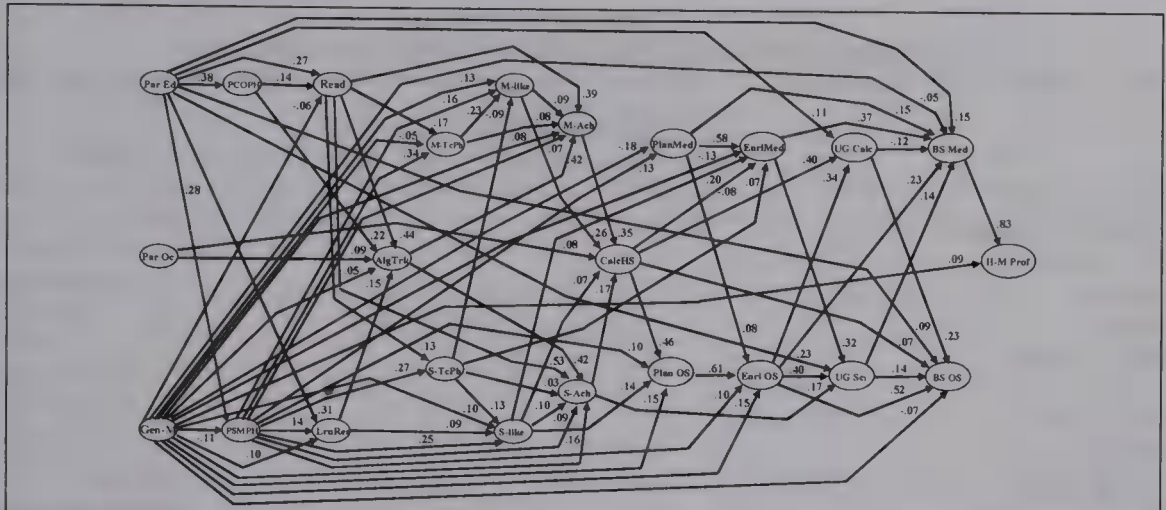
We note that 44% of students who entered PSE did not complete a baccalaureate degree (see Table 3). This pattern is consistent with reports from the National Center for Educational Statistics and other national surveys of this population.

In the postsecondary population, young women were more likely to earn a baccalaureate in a medical or health professional preparation program than were young men (see Table 3). Young men were more likely to earn a baccalaureate in a nonhealth STEM field than young women. Students whose parents had completed more education and who encouraged college enrollment were more likely to complete a baccalaureate in both a medical STEM field and a nonhealth STEM field than other students.

Although algebra track placement was not significantly related to initial enrollment in a premedicine or prehealth profession PSE program, algebra track placement was significantly related to the completion of a baccalaureate in a medical/health field (see Table 3). At the university level, the influence of the number of calculus courses completed during college differed between health-related STEM degrees and other STEM degrees. For students preparing for a medical or health career, the modal pattern was the completion of one or two college calculus courses, which undoubtedly reflects the degree requirement in many fields of science or other premed, prehealth degrees.

The completion of a baccalaureate in a relevant program is an essential gateway into medicine or the health professions, and almost all of these programs require additional graduate or professional training. There are a number of factors that may facilitate the pathway from a relevant baccalaureate into a medical or another health profession, but it is important to recognize that only a small proportion of the young adults who begin the pathway toward such a profession will successfully accomplish their goal. In the LSAY national sample, only 12% of students who initially enrolled in postsecondary preparatory programs for medicine or health eventually became medical or health professionals.

The influence of parent education on entrance into a medical or health profession was minimal (see Table 4). The children of parents with a college degree were significantly more likely than other young adults to enter a nonhealth STEM profession, but the influence of parent



Variables in Model		Medicine & Health STEMM
Gender	Student gender (male)	.02 _(.03)
Home and family	Parent education	.17 _(.03)
	Parent employment in a STEMM field	.00 _(.00)
	Parent college push during high school	.00 _(.00)
	Parent math-science push during high school	.09 _(.02)
	Home science learning resources	.01 _(.01)
	Student reading ability in high school	.01 _(.01)
Secondary schooling	Student algebra track middle and high school	.00 _(.00)
	Science teacher encouragement HS	.03 _(.01)
	Mathematics teacher encouragement HS	.00 _(.00)
	Student liked science as a subject in HS	.09 _(.02)
	Student liked mathematics as a subject in HS	.00 _(.00)
	Student science achievement score, grade 12	.02 _(.01)
	Student math achievement score, grade 12	.00 _(.00)
	Student completed calculus course in HS	.00 _(.00)
	Student planned to major in Pre-Med/Hlth. in coll.	.34 _(.04)
	Student planned to major in other STEMM in coll.	.12 _(.02)
Undergraduate Experience	Student initial enrollment in pre-med/health BS program	.34 _(.06)
	Student initial enrollment in other BS STEMM program	.20 _(.03)
	Number of student college calculus courses	-.10 _(.02)
	Number of student college science courses	.12 _(.03)
	BS in pre-med or health professions preparation	.83 _(.07)
	BS in STEMM field other than medicine/health	.00 _(.00)
R ² =		.68
Fit statistics: Degrees of freedom = 185; Chi squares = 1,398.0 (p = .00); Root Mean Square Error of Approximation (RMSEA) = .025; 90% confidence interval (RMSEA) = .022; .027; N = 2,888		

FIGURE 2 A path model to predict employment in a medical/health profession.

TABLE 3
Student Completion of a Baccalaureate in Premed or Health Program

	Earned Baccalaureate in . . . ^a			Did Not Complete	N
	Premed Health	Other STEMM	Non-STEMM		
All LSAY respondents	9%	12%	39%	44%	3,945
Student gender					
Female	6	6	33	55	1,935
Male	2	12	26	60	2,011
Parent education					
Less than HS	1	1	12	86	258
HS graduate	3	5	21	71	1,802
Some college	4	7	27	62	573
Baccalaureate	6	15	44	35	689
Graduate or professional	5	21	46	28	599
Parent college push					
0 (low)	0	2	5	93	305
1	1	3	16	80	572
2	4	7	28	61	1,694
3	5	13	43	39	1,129
4–5 (high)	8	24	41	27	246
Parent science-math push					
0 (low)	2	2	20	75	645
1	2	3	26	68	621
2	4	7	29	60	758
3	4	13	34	54	1,047
4–5 (high)	6	24	33	41	875
Algebra track					
No algebra course in HS	1	0	4	95	403
Algebra I in Grades 10–12	2	2	18	78	1,083
Algebra I in Grade 9	5	11	38	46	1,817
Algebra I in Grade 8	5	25	49	22	501
No. of college calculus courses completed					
None	3	2	23	71	2,797
1 or 2 courses	7	20	54	20	579
3 or more courses	2	61	29	9	249

Note. This table includes only respondents who enrolled in a community college or senior college. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; HS = high school.

^aPercentages may not total to 100% because of overlapping major fields such as biology.

education on successful entrance into medicine or other health professions was minimal in comparison. Apart from the level of education held by a student's parents, the amount of parent encouragement to attend college and to study science and mathematics was positively related to successful entrance into medicine or another health profession. Both of these factors appear to be more influential in encouraging young adults to enter nonhealth STEMM fields than medicine and health, but there was a positive relationship in both areas.

To assess the importance of these and other precollege and college factors on employment in medicine or other health professions, we turn to our extended path model. Employment in a

TABLE 4
Young Adult Employment in Medicine or Other Health Profession

	Currently Employed in . . .			Not Employed	N
	Medicine or Health Profession	Other STEMM	Non- STEMM		
All LSAY respondents	6%	7%	70%	17%	3,945
Student gender					
Female	8	2	65	25	1,934
Male	4	12	75	9	2,010
Parent education					
Less than HS	4	4	66	26	257
HS graduate	6	5	73	16	1,801
Some college	5	6	72	17	570
Baccalaureate	6	11	67	16	689
Graduate or professional	9	12	65	13	599
Parent college push					
0 (low)	3	2	75	21	306
1	3	5	73	19	572
2	6	7	79	18	1,693
3	7	9	69	14	1,129
4–5 (high)	15	9	67	10	245
Parent science-math push					
0 (low)	3	3	75	19	645
1	5	3	74	19	622
2	6	5	73	16	759
3	5	9	70	17	1,045
4–5 (high)	10	13	62	14	873
Algebra track					
No algebra course in HS	1	1	72	26	404
Algebra I in Grades 10–12	4	3	74	20	1,083
Algebra I in Grade 9	8	9	70	14	1,814
Algebra I in Grade 8	10	16	64	11	503
No. of college calculus courses completed					
None	5	3	73	19	2,797
One or two courses	11	13	66	10	578
Three or more courses	3	43	44	10	250

Note. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; HS = high school.

medical or health profession is only moderately associated with most of the major structural and gatekeeping variables that predict professional employment in other STEMM fields. The total effects of parent education (0.17) and parent math-science encouragement during high school (0.09) point to the influence of family. The early interest of a student in the medical and health professions (0.34) was the strongest precollege predictor of eventual employment in one of these professions. We do not have detailed information about the sources of this early interest in medicine or other health profession, but the socialization and career development literatures suggest that these early expectations are often rooted in family encouragement, interactions

with medical and health professionals as patients, and exposure to various health-related careers through the media.

Although the relative influence of many of the early family variables fade over the years, the importance of the major gates along the path continues. The completion of a baccalaureate in premedicine or another prehealth profession program was the strongest single predictor of eventual employment in medicine or other health professions (0.83). For almost all of the medical and health professions, some graduate or professional schooling is required. All but three of the individuals who qualified as medical or health professionals in this analysis had completed an advanced degree, but because of its near universality, the advanced degree will not work in the structural equation models used. These models are designed to understand the patterns of variance and covariance among the several variables, but the nearly universal requirement for graduate education eliminates any variance. We note this anomaly and remind readers that graduate education is indeed a necessary gateway into a medical or health profession.

DISCUSSION

This analysis indicates that the pathways to a career in a medical or health profession are long and complex. A child's home and school environment combine to provide a necessary set of cognitive and attitudinal tools. Parental influence is substantial during the precollege years, and the influence of well-educated parents persists in young adults 20 years after secondary school. This pattern is fully consistent with the current literature (Paa & McWhirter, 2000; Turner & Lapan, 2002). By saying this, we do not mean to imply that a young person's precollege years determine his or her occupational fate, but this time period does set some important parameters. Educators who plan college-based interventions need to be aware of the nature and magnitude of these factors. It may be possible to compensate for some early disadvantages, but ignoring these early structural factors entirely will not address the problem.

In contrast to other factors that influence entrance to a STEMM profession generally, the influence of gender on the selection of a medical or health professional career runs counter to the pattern found in broader STEMM studies (Miller & Kimmel, 2012/*this issue*) or in engineering (Pearson & Miller, 2012/*this issue*). Young women were more likely to enter baccalaureate level preparation programs for the medical and health professions, were more likely to graduate, and were more likely to be employed in one of these professions than young men. A subsequent analysis by Kimmel and Miller examines the role of gender in greater detail, but these results indicate that young women have been largely successful in entering the medical and health professions.

In contrast to other STEMM professions, the primary influence of mathematics on entrance into the medical and health professions is in meeting the admission requirements for university and graduate programs that are essential gateways to these professions. Students seeking admission to preprofessional programs in medicine and health often need 3 years of high school mathematics, and there is a broadly held belief that the completion of a high school calculus course will improve admission test scores. In this analysis, the completion of a high school calculus course was unrelated to eventual employment in a medical or health profession outside of this factor, and the number of college calculus courses was negatively related to employment in a medical or health profession (-0.10).

This analysis reaffirms the importance of degree completion at the baccalaureate level. In the LSAY cohorts, 44% of the students who enrolled in a postsecondary program failed to earn a baccalaureate in any field approximately 15 years after high school. We recognize that students will change their thinking about career choices during their college years and that this is generally a healthy process that enhances the fit between education and one's life work, but we are disappointed with the high level of noncompletion at the postsecondary level. In a flat and competitive world, dropping out of postsecondary education has serious economic consequences that are often difficult to recover from in later years.

As noted earlier, successful entrance into medicine or other health professions almost always requires a graduate or professional degree. The small number of students reaching this level, and the near universal enrollment in graduate courses of those that did, precluded the incorporation of a graduate education variable in our model. Despite this omission, we wish to stress that the completion of a relevant baccalaureate degree is only one more gate on the path. The completion of a graduate and professional education is equally essential to a student's ultimate entry into a medical or health professions.

Finally, we observe that medicine and the other health professions appear to be relatively more accessible to young adults from less advantaged backgrounds than other STEMM fields. Our analysis shows that the level of parent education was only weakly associated with entrance into a medicine or health profession (see Table 4). Although the children of the least well-educated parents were unlikely to enter medicine or any other STEMM field, the children of parents with some college work or with a baccalaureate were nearly as likely to enter medicine as the children of parents with more advanced education. Comparatively, the children of parents with higher educational backgrounds were significantly more likely to enter other STEMM fields than were the children of the less educated parents. We do not mean to suggest that entrance into medicine or other health professions is a completely level playing field without parental or family advantage, but these results indicate that the magnitude of parental and home advantage has narrowed and is smaller today than the advantage associated with other STEMM fields.

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Pathways to STEMM Support Occupations

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The preceding articles in this issue of the *Peabody Journal of Education* have focused on preparation for and entry into professional positions in science, technology, engineering, mathematics, and medicine (STEMM). This article shifts the focus from professional positions to STEMM support occupations, focusing on the preparation necessary for entrance into this alternate STEMM field. As a group, STEMM support occupations feature shorter periods of formal training for entry, lower requirements for advanced study, and more flexibility in regard to the timing and entry into the workforce. Many of the young adults who eventually entered a STEMM support occupation did not make that decision until later along the educational pathway than did students who became STEMM professionals. Beyond the general features of the support occupations, an initial analysis also points to important differences between support occupations related to medicine and support occupations related to other areas of science and technology.

J. D. Miller and Solberg (2012/this issue) outline the rationale for the separate analysis of the pathways to science, technology, engineering, mathematics, and medicine (STEMM) professions and STEMM support occupations in their preceding article. Several analyses in this special issue have subsequently looked at the pathways that predict the selection of and entry into STEMM professions (Fuchs & Miller, 2012/this issue; Miller & Kimmel, 2012/this issue; Pearson & Miller, 2012/this issue). Reflecting our sense of the importance of STEMM support workers to the scientific enterprise (Miller & Solberg, 2012/this issue), this analysis examines the pathways that lead to employment in a STEMM support occupation.

As an occupational group, STEMM support occupations require substantial focused coursework and often require a postsecondary degree or certificate. Some STEMM support occupations require a state or local license, whereas some require periodic reexamination or recertification. The support field consists of various diverse occupations and skills. New job descriptions emerge relatively quickly as new technologies develop, reaching laboratories and consumers at ever-increasing rates (Alfonso, Bailey & Scott, 2005; American Association of Community Colleges (AACC), 2008; American Hospital Association (AHA), 2010; Buerhaus, Auerbach, & Staiger, 2007; Carden, Allsbrook, & Thomas, 2009; Donini-Lenhoff, 2008;; Grubb, 2002; Hamison &

VanNoy, 2004; Holzer & Lerman, 2007; Lang, 2009; Miller & Gallicchio, 2007; Zinser & Lawrenz, 2004).

About 55% of the occupations classified as STEMM support fall under the category of health and medical services. Many laboratory technician job categories are well known, and many postsecondary educational institutions offer associate and baccalaureate programs to prepare new entrants for these occupations. In recent decades, a number of new therapist occupations have also developed and continue to expand as the range of rehabilitation and need for geriatric services increases (Lang, 2009).

In a parallel process, the current revolution in information and communication technologies has generated a growing range of alternate support occupations, ranging from webmasters to information network specialists. These same technologies have reshaped other STEMM support positions—the work of traditional draftsmen and blueprint makers has become a computer-based activity. In a similar pattern, the work of statistical assistants and data managers has been transformed by faster computers, cheaper memory, and better software.

Using data from the Longitudinal Study of American Youth¹ (LSAY), we explore the origins of student interest in these occupations and the courses and skills needed to gain employment in a STEMM support occupation. Following the argument outlined by Miller and Solberg (2012/*this issue*), we conclude that it is analytically useful to cluster STEMM support occupations into those related to health and medicine and those related to science and technology (*sci-tec*). We examine the utility of this distinction as we explore the origins and patterns associated with these occupations.

THE ORIGINS OF ADOLESCENT INTEREST IN STEMM CAREERS

In the preceding analyses of STEMM professions in this issue (Fuchs & Miller, 2012/*this issue*; Miller & Kimmel, 2012/*this issue*; Miller & Pearson, 2012/*this issue*), a standard model of parental and home influences was used to assess the influence of these factors on student choices. As Miller and Solberg (2012/*this issue*) described in their introductory article about the distinctions between STEMM professions and STEMM support occupations, most of the young people employed today in STEMM support jobs indicated in high school that they expected to enter a STEMM profession (see Table 1). This estimate is a maximal measure because it includes students who reported careers that could become a STEMM profession or a STEMM support occupation but that was indeterminate at that point in the educational process. For example, the estimate of students expecting to enter a STEMM profession included all high school students who indicated that they planned to become a nurse or enter nursing as a field. We classify students with a master's or doctoral degree in nursing as STEMM professionals, whereas students with an associate or baccalaureate degree in nursing are classified as STEMM support workers. Many high school students who plan to enter nursing, for example, may not know which degrees they will earn or whether they will seek a graduate degree while still in high school. Understanding the ambiguity

¹The LSAY is a 23-year longitudinal study of approximately 5,000 young adults who have been followed from Grades 7 and 10 in 1987 and continue to be surveyed annually. For a more complete description, see Miller and Kimmel (2012/*this issue*) or the LSAY website: <http://www.lsay.org>.

TABLE 1
Educational and Background Characteristics of STEMM Support Workers

	All LSAY Participants	STEMM		
		Profession	Health Support	Sci-Tec Support
Gender				
Female	49%	30%	77%	16%
Male	51	70	23	84
Parent education				
Less than high school	7	1	8	6
High school graduate	46	26	58	37
Some college	14	10	11	18
Baccalaureate	18	26	15	22
Graduate or professional	15	37	8	17
Parent college push				
0 (low)	8	0	8	6
1	14	4	12	19
2	43	36	52	44
3	29	44	23	26
4–5 (high)	6	16	5	5
Parent science-math push				
0 (low)	16	4	14	8
1	16	7	15	9
2	19	14	21	15
3	27	22	25	38
4	19	45	22	29
5 (high)	3	8	3	1
N	3,945	273	131	106

Note. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth.

of this measure, nearly 40% of young adults currently employed in a STEMM support occupation expressed an interest in a career that could have become a STEMM profession. We examine this early decision-making process using the same variables that were employed to examine pathways to a STEMM profession.

Although all of the preceding models were based on a broad literature involving early family learning and socialization (Entwisle, Alexander, & Olson, 1997; Davis-Kean, 2005; Heppner & Scott, 2004; Lee & Burkam, 2002; Massey, 2007; Whiston & Keller, 2004), our discussion of these early career decision processes seeks to link these variables and processes to what career development scholars refer to as the social cognitive career theory (SCCT) model (Lent, Brown, & Hackett, 1994, 2000). Building on Bandura's (1989, 1991) social cognitive theory, Lent, Brown, and Hackett focused on the development of a sense of career self-efficacy—the belief in the ability of an individual to acquire the skills necessary for an occupation—and outcome expectations—the perception that an occupation will provide desirable outcomes for one's quality of life. Recognizing that some readers of this analysis will be more comfortable with traditional sociological and psychological labels for various processes, and that some

readers with a grounding in the career development literature may prefer SCCT terminology, we try to bridge these communities by providing appropriate links and language whenever possible.

Although the LSAY was initiated prior to the publication of the SCCT model, a substantial number of variables were collected by the LSAY during postsecondary schooling measure equivalent or similar constructs. The conceptual foundation of the LSAY has its roots in the socialization, social psychology, and learning theory literatures (Bandura, 1989, 1991; Berger & Luckmann, 1966; Sternberg & Ben-Zeev, 2001; Sternberg, 2007). Many of these constructs are similar to the terms and constructs that have emerged from the SCCT literature. Processes that social psychologists might refer to as socialization, parent influence, and role modeling are referred to as *contextual affordances* in the SCCT literature (Astin, 1984; Vondracek, Lerner, & Schulenberg, 1986). Some terms—learning experiences, career interests, and choice goals—are used in the SCCT literature and have a direct translation into traditional learning theory. We see no inherent conflict in these two sets of terms and constructs and hope that this analysis may be helpful to other analysts in bridging the research and thinking between these two communities.

The literature concerning STEMM support occupations is fragmented and often narrowly focused on particular technical specializations—operating room technicians, nutritional specialists, and various specialized therapeutic occupations (Brown, Wagner, Mikkelsen, & Munson, 2005; Babin, Grant, & Sawal, 2010; Carden, Allsbrook & Thomeş, 2009; Dominelli & Wheeler, 2006; Thatcher, Stepina, & Boyle, 2003; Zinser & Lawrenz, 2004). There is a larger literature on nursing, spanning the several levels of nursing education (Brewer et al., 2006; Hemsley-Brown & Foskett, 1999; Ingersoll, Oslan, Drew-Cates, DeVinney, & Davies, 2002; Kirby, 2009). There are several industry-oriented examinations (AACC, 2008; AHA, 2010). Although several pieces look at allied health occupations broadly (Baldwin & Agho, 2003; Donini-Lenhoff, 2008; Lankes & Bonner, 2003; Mase, 1973; Miller & Gallicchio, 2007), there are no previous efforts to conceptualize this cluster of occupations relative to STEMM professionals.

A pattern emerges when we look across the various specialized occupations studied separately. Often driven by the need to enroll a sufficient number of students to sustain various community college programs, as well as by a parallel industry need for trained workers, finding ways to attract students into specific programs and specializations has become a broadly held concern. There are numerous reports of dissatisfaction among health support workers (McHugh, Kutney-Lee, Cimiotti, Sloane, & Aiken, 2011; Shader, Broome, Broome, West, & Nash, 2001) and some reports of retention problems among information technology support workers (Thatcher, Stepina, & Boyle, 2003). In addition, researchers now generally recognize that the pace of change in new technologies will require higher levels of technical training and more frequent re-training (AACC, 2008; AHA, 2010).

Given this literature, we find it especially appropriate to examine the pathways to these STEMM support occupations from the perspective of the scientific workforce and in the context of their complimentary roles to the STEMM professions. We appreciate program developers' and managers' need for detailed information about the specific technical fields for which they train workers, but we hope that this broad perspective will provide a framework within which the separate narrower studies will make greater sense and be of increased utility to program developers, operators, and funders.

METHODS

This analysis is based on the cumulative record of the LSAY (see Miller & Kimmel, 2012/*this issue*, for a description of the LSAY sample and structure). Additional information about the history and current status of the LSAY can be found at <http://www.lsay.org>.

The current data from 3,945 respondents are used in the descriptive discussion about the current employment of STEMM professionals and STEMM support workers. In the structural equation model and analysis, we excluded from the population those LSAY respondents who were employed as STEMM professionals. This was done to prevent collinearity problems and to provide a clearer picture of the effects of selected background and educational variables on successful entrance into a STEMM support occupation.

The Flow of Young Adults Into STEMM Support Occupations

The literature on pathways to the STEMM professions and the three preceding analyses in this issue indicate that two of the defining characteristics of aspiring STEMM professionals are (a) an early recognition of interest in a STEMM profession and (b) a parallel understanding of the importance of mathematics as a necessary prerequisite for many professional pathways. In their analyses leading to the proposal to treat STEMM professions and STEMM support careers separately, Miller and Solberg (2012/*this issue*) found that young adults who entered a STEMM support occupation were less likely to have started algebra in eighth grade, less likely to have completed a high school calculus course, and more likely to be in the lower three quintiles of science and math achievement than young adults who became STEMM professionals. These patterns suggest that many high school students who eventually entered a STEMM support occupation did not form clear STEMM occupational plans until later in their secondary school years, which may have contributed to their not perceiving the relevance of completing math and science courses that would support entry into STEMM professional careers.

To understand the source of these patterns, we return to the general socialization and family learning models discussed earlier. Parental and home factors provide important early influences on the development of educational and occupational interests (Berger & Luckmann, 1966; Davis-Kean, 2005; Lee & Burkam, 2002; Massey, 2007; Parsons, Adler, & Kaczala, 1982; Whiston & Keller, 2004). Parents are often a significant influence on language and reading skills and are often role models for educational attainment. According to the LSAY data, the parents of STEMM sci-tec support workers were slightly better educated (as a group) than the parents of all LSAY students, but they were slightly less well educated than the parents of students who eventually became a STEMM professional (see Table 1). The parents of STEMM health support workers were slightly less educated (as a group) than all LSAY parents and significantly less educated than the parents of young adults who became STEMM professionals.

Better educated parents are more likely to encourage their children to attend college than less educated parents and are more likely to encourage their children to study mathematics and science during secondary school, including early enrollment in algebra and the completion of a first calculus course during high school (Davis-Kean, 2005; Parsons et al., 1982). An examination of the LSAY data shows that the parents of young adults who eventually entered a STEMM support occupation encouraged college attendance at about the same level as all LSAY parents (as a group)

but that they provided a somewhat lower level of college push than the parents of young adults who entered a STEMM profession (see Table 1).

There was, however, more differentiation in the level of explicit math-science encouragement that parents gave their children. Of the young adults who eventually became STEMM professionals, 53% reported that their parents strongly encouraged them to study science and mathematics during high school (a score of 4 or 5 on a 0–5 index). In comparison, just 30% of students who became STEMM sci-tec support workers, and 25% of students who eventually entered a STEMM health support occupation (see Table 1), reported strong encouragement in science and math. Comparatively, 22% of all LSAY parents provided a high level of science and math encouragement during high school.

The LSAY data also point to a substantial gender difference in the selection of STEMM support careers. Twenty years after high school, 77% of the young adults in STEMM health support occupations were women and 84% of the young adults in STEMM sci-tec support careers were men (see Table 1). This difference is not a reflection of educational attainment—47% of both health support workers and sci-tec support workers completed at least a baccalaureate. Kimmel and Miller (2012/*this issue*) provide a detailed analysis of gender differences in becoming a STEMM professional, and we need not repeat their literature review at this point, but the work of Su, Rounds, and Armstrong (2009) makes a strong case that data from high school vocational interest instruments point to a tendency for young women to favor occupations that involve working with people and a tendency for young men to favor occupations that involve working with things.

Beyond parental factors and student gender, the nature of STEMM support occupations suggests that new entrants need fewer advanced mathematics courses for success in the field, especially with regards to STEMM health support occupations. It is likely, however, that most of these support occupations require high school and postsecondary science courses. At the same time, a substantial number of STEMM support jobs appear to be linked to education at the associate degree level. We would expect that the completion of an associate degree in a scientific or health-related field would be especially useful as an entrance qualification for many of these occupations.

The data for LSAY young adults currently employed in STEMM support occupations confirm these expectations (see Table 2). Compared to STEMM professionals, young adults employed in STEMM support occupations were significantly more likely to have started their postsecondary education in a community college and to have taken substantially fewer college calculus and science courses. LSAY young adults currently employed in STEMM support jobs were markedly less likely to have completed graduate or advanced degrees and more likely to have earned only associate degrees.

From our reading of the literature and from the bivariate relationships we have observed in the LSAY data, it is clear that a number of factors have some influence on the selection of and entrance into a STEMM support career. The bivariate tables provide some useful insights, but they do not—and cannot—tell us the relative influence of each of these factors operating in the lives of individuals. For this purpose, we turn to the construction and analysis of a structural equation model to predict employment in a STEMM support occupation.

A Model to Predict Employment in a STEMM Support Occupation

To assess the relative impact of selected parental, home, school, and educational variables on current employment in a STEMM support career, the precollege variables used to predict

TABLE 2
Selected Educational and Course Characteristics of STEMM Support Workers

	All LSAY Participants	STEMM		
		Profession	Health Support	Sci-Tec Support
Postsecondary enrollment				
No PSE	22%	0%	3%	9%
Started in community college	36	14	57	42
Started in 4-year institution	42	86	40	49
Undergraduate science courses				
None	39	0	13	24
1–3 courses	16	2	4	16
4–7 courses	18	6	34	18
8 or more courses	27	92	49	42
Undergraduate calculus courses				
None	78	26	83	65
1 or 2 courses	16	37	15	25
3 or more courses	6	37	2	10
Highest degree earned				
Less than high school	3	0	0	0
High school graduate or GED	46	0	16	34
Associate degree	8	2	37	19
Baccalaureate	27	33	41	28
Master's degree	12	33	6	19
Doctorate or professional	4	32	0	25
<i>N</i>	3,945	273	131	106

Note. STEMM = science, technology, engineering, mathematics, and medicine; LSAY = Longitudinal Study of American Youth; PSE = postsecondary educational institutions.

employment in a STEMM profession were adopted (see Figure 1). There are good reasons to expect that the structure of parental, teacher, and school influence is similar for high school students thinking about various STEMM related careers, and it would be instructive to see the patterns related to entrance into a STEMM support occupation in contrast to previous models focused on STEMM professionals (Fuchs & Miller, 2012/*this issue*; Miller & Kimmel, 2012/*this issue*; Miller & Pearson, 2012/*this issue*). Reflecting the discussion of the role of community colleges in preparing new entrants to STEMM support careers, we added two additional variables to indicate the completion of an associate degree in a health-related field and the completion of an associate degree in a science or technology field other than health. The two outcome variables are current employment in a STEMM health support occupation and current employment in a STEMM sci-tec support occupation. A detailed description of the construction of each variable in the model is included in the appendix. The model was estimated using LISREL 9.0 (Hayduk, 1987; Jöreskog & Sörbom, 1993).

Recalling that influence in a SEM flows from left to right, the model shown in Figure 1 is a description of the relative influence of selected variables from middle school through young adulthood. Three exogenous variables reflect the gender of the student, the education of the student's parents, and whether the student's parents were employed in a STEMM occupation at the time that the student was in secondary school. Other parental and school behaviors and decisions are reflected in the approximate order—logically or chronologically—that they occurred

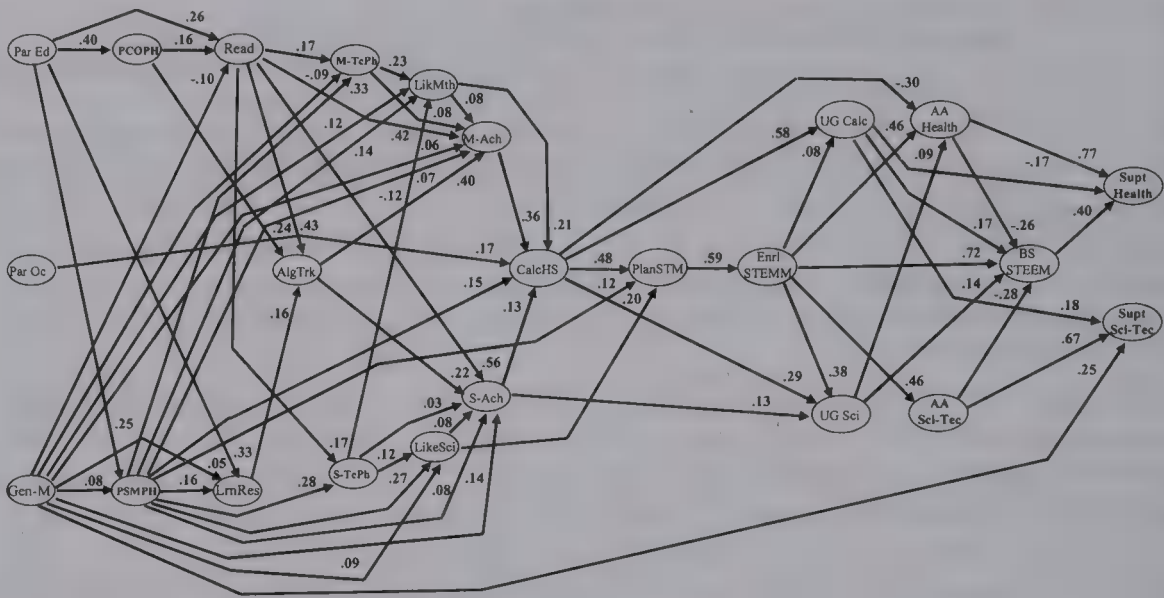


FIGURE 1 A path model to predict employment in a science, technology, engineering, mathematics, and medicine (STEMM) support occupation.

in a student’s life. Behaviors and activities that occur at about the same time and within a common period are shown in the same special column in the model and the error terms (if any) are allowed to correlate.

The individual paths within the model tell many smaller interesting stories, but the purpose of this analysis is to identify the factors that predict employment in a STEMM support occupation two decades after high school and, for that purpose, we are more interested in the total effect of each of the variables on that outcome. One of the most useful features of a SEM path model is that it allows the calculation of the total effect of each of the model’s variables. These total effects can be seen in Table 3.

The strongest background factor was student gender. Male young adults were significantly more likely to enter a STEMM support occupation in science or technology than young women, but there was no gender difference in the likelihood of young men and women entering a STEMM support occupation related to health. Consistent with previous research, it appears that some of the STEMM sci-tec support jobs have a stronger appeal to young men than young women.

Most of the traditional parental and home background variables—parent education, parent employment in a STEMM job, parent college push, parent encouragement in science and mathematics, and home science learning resources—made little or no difference in predicting the subsequent employment of a young adult in a STEMM support job. In addition, the impact of traditional school variables—teacher encouragement in science or mathematics, eighth-grade algebra, student reading level, and student attitude toward science or mathematics—had little or no impact on predicting employment in a STEMM support occupation 20 years after high school.

Academically, student achievement scores in high school science made no difference in the predicted outcomes. Student achievement scores in high school mathematics did, however, make a small (0.07) difference in the prediction of employment in a sci-tec STEMM support occupation. Students with higher math achievement scores in high school were slightly more likely to find

TABLE 3
Total Effect of Variables Predicting Employment in a STEMM Support Occupation

Variables in Model	Employed in STEMM Support	
	Health	Sci-Tec
Student gender (male)	.01(.00)	.26(.04)
Parent education	.00(.00)	.05(.01)
Parent employment in a STEMM field	-.01(.00)	.03(.01)
Parent college push during HS	.00(.00)	.02(.00)
Parent math-science push during HS	.05(.01)	.08(.02)
Home science learning resources	.00(.00)	.01(.00)
Student reading ability in HS	.00(.00)	.06(.01)
Student algebra track middle school and HS	-.01(.00)	.03(.01)
Science teacher encouragement HS	.01(.00)	.00(.00)
Mathematics teacher encouragement HS	-.01(.00)	.02(.00)
Student liked science as a subject in HS	.07(.01)	.04(.01)
Student liked mathematics as a subject in HS	-.01(.01)	.05(.01)
Student science achievement score, Grade 12	.00(.00)	.03(.01)
Student math achievement score, Grade 12	-.02(.01)	.07(.02)
Student completed calculus course in HS	-.06(.02)	.20(.04)
Student expectation of STEMM major Grade 12	.34(.03)	.19(.04)
Student initial enrollment in PSE STEMM program	.58(.05)	.32(.07)
No. of student college calculus courses	-.10(.02)	.18(.07)
No. of student college science courses	.12(.03)	.00(.00)
Associate degree in a health field	.66(.09)	.00(.00)
Associate degree in a science-technology field	-.11(.04)	.67(.19)
Student undergraduate major in STEMM field	.40(.06)	.00(.00)
R^2	.76	.59

Note. Fit statistics: $df = 200$; $\chi^2_s = 2162.7$ ($p = .00$); root mean square error of approximation (RMSEA) = .029; 90% confidence interval_(RMSEA) [.027, .031]; $N = 3,665$. Cell entries: .36(.05). Each cell entry is the total effect for that variable on the outcome variable. The standard error of each total effect is shown in parentheses. STEMM = science, technology, engineering, mathematics, and medicine; HS = high school; PSE = postsecondary educational institution.

employment in a STEMM sci-tec support career two decades after high school than students with lower math achievement scores. The completion of a high school calculus course was a relatively strong predictor of young adult employment in a STEMM sci-tec support occupation (0.20), but the completion of high school calculus had a small negative relationship to employment in a STEMM health support occupation (–0.06). This pattern reflects the greater use of mathematics and calculus in some of the technologies included in the sci-tec job fields and the less frequent use of mathematics in health support occupations.

High school students who expressed an interest in a STEMM career during high school were significantly more likely to find employment in a STEMM support job as young adults, and the relative influence of these early expectations was greater for STEMM health support jobs (0.34) than for STEMM sci-tec support jobs (0.19).

Reflecting the importance of educational certification, initial enrollment in a postsecondary STEMM program was a significant predictor of young adult employment in a STEMM support field. This relationship was stronger for health support jobs (0.58) than sci-tec support jobs (0.32).

The number of postsecondary calculus courses was a moderately strong predictor of employment in a sci-tec support occupation (0.18) and was negatively related to employment in a health support job (-0.10). The number of postsecondary science courses was positively related to young adult employment in a STEMM health support occupation (0.12) and unrelated to employment in a sci-tec support job (see Table 3).

The attainment of an associate degree from a community college was a strong predictor of young adult employment in a STEMM support career, and the major field in which the degree was obtained was strongly differentiated. Young adults with an associate degree in a health-related field were significantly more likely to be employed in a STEMM health support job (0.66), whereas young adults with an associate degree in science or technology were significantly more likely to find employment in a sci-tec support job (0.67). These results point to both the gatekeeping role of degrees and the close fit between degree field and the kind of occupation likely to be held.

DISCUSSION

We can conclude several points from the preceding analysis that merit discussion. First is that the sources and backgrounds of students who enter the pathway to a STEMM support occupation are significantly different than the sources and backgrounds of students who eventually become STEMM professionals. Beginning the study of algebra in eighth grade if possible, and no later than the ninth grade at the latest, secondary school students who wish to enter a STEMM profession must make at least a preliminary commitment to a STEMM profession by the beginning of high school (Parsons et al., 1982; Whiston & Keller, 2004). In contrast, students who eventually enter a STEMM support occupation are significantly less likely to take high school or college calculus (although some sci-tec support jobs clearly need it), and they were able to take algebra later in high school while still meeting the qualifications for various STEMM support jobs. STEMM support workers were also less likely to earn a graduate or professional degree. Although many young adults who eventually entered a STEMM support occupation expressed some interest in the general STEMM area during their secondary school years, this pattern was less definitive than that found for young adults who became STEMM professionals.

Second, within the broad classification of STEMM support occupations, our analysis found that there were differences in the education, background, and course predictors between young adults who entered sci-tec support jobs and young adults who entered health-related STEMM support jobs. Although employment in a STEMM support job was related to the completion of an associate degree, the major field of study differentiated young adults employed in health support job and sci-tec support jobs. A higher proportion of young adults who entered the health field earned a baccalaureate degree when compared to their sci-tec counterparts. Mathematics and calculus were important predictors of employment in a sci-tec support occupation but had little predictive power in regard to health-related support jobs.

Third, the lower educational requirements for most STEMM support jobs meant that it was possible to attract students into these fields somewhat later in the educational process than was possible for STEMM professions. Several programs operated by the National Science Foundation and the National Institutes of Health seek to address diversity goals in both professional and support occupations, and this analysis suggests that the timing for those interventions should

differ significantly. Programs hoping to attract students into a STEMM profession need to begin early in the secondary school years, making a sustained commitment over a number of years, but programs aimed at increasing racial or gender diversity in STEMM support occupations may begin as late as high school or the first years of college. LSAY staff reported that there were a small but growing number of young adults who had returned to a community college in their early 30s to complete the courses and degrees necessary to enter a STEMM support career. Program designers must understand the implications of these timing differences and create programs that provide viable opportunities at appropriate times.

Fourth, this analysis found no significant gender differences in employment in STEMM health support occupations, but a significant gender difference in employment in sci-tec support jobs. Young men were significantly more likely work in STEMM support jobs involving science or technology outside health. In addition, a substantial portion of the jobs was in information technology-related work.

Finally, young adults employed in STEMM support occupations were more likely to have come from homes where their parents held only high school diplomas and less likely to have come from homes in which one or more of their parents held a baccalaureate, graduate, or professional degree (see Table 1). This pattern suggests that employment in STEMM support jobs may be part of a generational path into science and technology. Many of the young adults who eventually entered a STEMM support occupation expressed an interest in a STEMM career during high school. These young people may have dreamed of a career in engineering or medicine but may not have fully realized the requirements necessary for such a profession. Despite these hurdles, some young adults from noncollege homes were successful in pursuing a STEMM. Overcoming the necessary and numerous gateways, they beat the trend to reach professional STEMM employment.

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APPENDIX
Variables and Scales Used in Analysis of Pathways to STEMM Professions

Variable or Scale	Definition and Construction
Student gender (male)	In this model, gender was treated as a <i>dummy variable</i> and male respondents were assigned the higher value.
Parent education	This variable reflects the highest level of education attained by either parent. For single parents, the education of the single parent is used for the parent education variable. Parent education is a dichotomous variable in this analysis which is used to divide the sample into groups: (a) parents with a baccalaureate, graduate or professional degree and (b) parents with less education.
Parent employment in a STEMM occupation	This ordinal variable classifies parents as not employed in a STEMM field, employed in a STEMM support job (14%), or employed as a STEMM professional (7%).
Parent college push	This five-level ordinal variable reflects the level of parent encouragement of a student to prepare for and attend PSE. The basic questions ask parents how much education that they would like their LSAY student to complete and how disappointed they would be if the student did not complete that level of education.
Parent science-math push	This six-level ordinal variable reflects student reports about various parent activities and behaviors encouraging science or mathematics.
Home science learning resources	This seven-level ordinal variable is a count of the number of science learning resources that each student reported were available in his or her home.
Student reading score	Each LSAY student completed a reading test as a part of in-school testing. The reading test was composed of passages that were originally used in Coleman’s High School and Beyond Study or the NCES National Educational Longitudinal Study of 1988. IRT methods were used to compute a reading score (0–100).
Algebra track	This is a three-level ordinal variable: (a) no algebra course in high school or algebra in Grade 10 or later, (b) algebra in Grade 9, and (c) algebra in Grade 7 or 8.

Variable or Scale	Definition and Construction
Science teacher push Mathematics teacher push	Separate five-level ordinal variables were computed for each high school science or math teacher, using student reports about the frequency of teacher encouragement to study science or math in high school and in the future.
Student attitude toward science Student attitude toward mathematics	During secondary school, each LSAY student was asked each year how much they liked the subject matter of each course in which they were enrolled, using an A-to-F grade card format. Separate five-level ordinal variables were constructed using student responses for science and math courses.
Student mathematics achievement score Student science achievement score	Using the NAEP item pool, achievement tests in math and science were developed, using IRT methods. The 1st-year achievement tests were comprehensive, but subsequent tests were tailored to three levels of achievement to obtain a more accurate measure of achievement. For this model, the achievement scores for the senior year were used. The achievement scores range from approximately zero to 100.
Student expectation of a STEMM major in college	This variable is included in the analysis as a dichotomous variable.
Student calculus course in high school	This variable is entered into the model as a dichotomous variable.
Initial enrollment in a post-secondary STEMM program	This variable is a dichotomous variable with a value of 1 for enrollment in a community college or a senior college.
Number of undergraduate calculus courses completed	This interval variable is a count of the number of calculus (or higher math) courses completed during undergraduate study.
Number of undergraduate science and engineering courses	This interval variable is a count of the number of science, engineering, and technology courses completed during the undergraduate years.
Associate degree in a health field	This dichotomous variable indicates whether or not each individual earned an associate degree in a health field.
Associate degree in a science-technology field	This dichotomous variable indicates whether or not each individual earned an associate degree in a science-technology field.
Undergraduate major in a STEMM field	This dichotomous variable indicates whether each individual completed a baccalaureate degree in a STEMM field.
Employment in a STEMM support job in health	This dichotomous variable indicates whether each individual is employed in a STEMM support job in health.
Employment in a STEMM support job in science-technology	This dichotomous variable indicated whether each individual is employed in a STEMM support job in science-technology.

Note. STEMM = science, technology, engineering, mathematics, and medicine; PSE = postsecondary educational institutions; LSAY = Longitudinal Study of American Youth; IRT = item response theory; NAEP = National Assessment of Educational Progress.

Do the Paths to STEMM Professions Differ by Gender?

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In this article we examine gender differences in factors related to science, technology, engineering, mathematics, and medicine (STEMM) education and employment between the ages of 36 and 39. Using data from the Longitudinal Study of American Youth, we identified a STEMM high school talent pool. We found early gender differences in interest in engineering, although we found no such differences in entry into a general STEMM undergraduate major. Throughout the course of the study, we developed and tested structural equation models. We discovered that there were no major gender differences in family encouragement or precollege educational experiences, except that high school boys were slightly more likely to take calculus in high school. There were no significant differences in entrance into medicine and other health professions, but there were substantial gender differences in earned engineering degrees and employment in engineering. The completion of a graduate or professional degree was a stronger predictor of female employment in a STEMM profession than for young men. Among young adults with academic qualifications for a STEMM profession, the presence of children 18 years of age or younger in the family made no difference in the likelihood of employment in a STEMM profession.

Gender is a significant predictor in almost all educational studies, and it is especially important to consider when thinking about careers in science, technology, engineering, and mathematics (STEM; Betz, 1997; Clewell, Anderson, & Thorpe, 1992; Cross, 2001; Eccles, 1994, 2009; Hanson, 1996; V. E. Lee, Croninger, & Smith, 1997; Rosser, 2004; Watt & Eccles, 2008) and careers in the medical and health professions (American College of Surgeons, 2010; Irvine & Vermilya, 2010; Okwuje, Anderson, Siaya, Brown, & Valachovic, 2008). Miller and Solberg (2012/*this issue*) suggest that most research on careers in STEM and medicine is artificially segregated and combine these two strands into a single strand—STEMM (science, technology, engineering, mathematics, and medicine). This combination reflects a substantial literature (Farmer, 1978; Krumboltz, 1994, 1996; Mihal, Sorce, & Comte, 1984; Mitchell & Krumboltz, 1984, 1990; Super, 1980; Super & Bowsbey, 1979) showing that adolescents develop sets of interests that range across this artificial divide. A high school student or a beginning college student who has become interested in biochemistry could be on a career path to science, medicine, or perhaps even biomedical engineering. Taking into consideration the changing nature of STEMM fields and our developing understanding of what drives students to pursue those fields, we can no longer segregate STEM and medicine into separate tracks.

Building on several decades of prior work (Krumboltz, 1994, 1996; Miller & Brown, 1992a, 1992b; Lent, Brown, & Hackett, 1994, 2000; Peterson, Krumboltz, & Garmon, 2005; Super, 1980; Super & Bowlsby, 1979), Miller and Kimmel (2012/*this issue*) developed a general model to explain the pathways to STEMM professions and discovered significant gender differences in STEMM professions. Similarly, Eccles and colleagues developed a general model for understanding gender differences in occupational choices, particularly those related to STEMM professions (Eccles, 1994; Eccles, Adler, Futterman, Goff, & Kaczala, 1983; Eccles, Barber, & Jozefowicz, 1999). We have adopted these two general models, moving beyond aggregate differences in level to explore potential structural differences in factors that differentially lead men and women to pursue careers in STEMM fields. By exploring structural differences, we can discover whether various home and school influences have differing effects on the likelihood that men and women will become STEMM professionals. We have also used data from the Longitudinal Study of American Youth (LSAY) to chart students' educational progression into STEMM careers, in the process uncovering ways in which men and women diverge. We have identified and described a STEMM talent pool of participants (similar to Eccles's, 1994, "intellectually capable" population) with the precollege preparation and achievement needed to pursue undergraduate studies in STEMM. Using these data, we modeled initial enrollment in a STEMM major and employment in STEMM to uncover gender differences in factors associated with each outcome.

We turn first to a brief review of the literature on gender differences. Like the literature itself, we have separated our review into two broad streams of research: (a) science, technology, engineering, and mathematics careers, and (b) medical and health careers. In our review of the literature, we use the STEM acronym to reflect studies that examined careers only in science, technology, engineering, and mathematics. In our methods, results, and conclusion sections, we use STEMM to refer to our outcome measures of majors and careers in the science, technology, engineering, mathematics, and medical professions.

LITERATURE: SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS PROFESSIONS

Clewell and Campbell (2002) traced changes in gender differences over a 20-year period, noting that, with some exceptions, gender differences in science and math course selection and achievement narrowed considerably; however, differences in career aspirations and choices did not (Watt, 2008; Xie & Shauman, 2003). In general, women were less likely than men to both obtain bachelor's degrees and be employed in the fields of engineering, computer science, and physics (Higher Education Research Institute, 2009; National Science Board (NSB), 2010b; National Science Foundation, 2011).

Prior longitudinal data analysis on STEM careers found that math and science course selection and performance were crucial determinants of a quantitative college major (Eccles, 2007; Eccles et al., 1999; Ethington & Wolfle, 1988; Farmer, Wardrop, Anderson, & Risinger, 1995; Ma & Johnson, 2008; Maple & Stage, 1991; Sells, 1980; Shaw & Barbuti, 2010; Trusty, 2002). Trusty (2002) found gender differences in the effects of course selection on decisions to major in STEM. Trusty also found that math scores had a stronger relationship with decisions to major in STEM for women, and science scores had the stronger relationship for men. Shaw and Barbuti (2010) found that high school performance in math and science, advanced placement exams in STEM

areas, higher science self-efficacy, and aspirations for a doctorate correlated to persistence in STEM majors. They also discovered that female students were less likely than male students to persist in STEM majors. Ma and Johnson (2008) reported that 2nd-year algebra was a critical filter for students planning to enter engineering and the physical sciences. This filter is especially important for young men. Xie and Shauman (2003) re-examined the effect of early course work on gender differences using 17 national data sets (including the LSAY) and rejected the argument that mathematics course selection is critical to gender differences in STEM careers. They found that there were minimal differences in the selection of high school math courses by male and female students in recent decades. According to Xie and Shauman, the small differences in male and female enrollment in calculus courses could not explain the larger differentials between the genders in engineering or the physical sciences.

Drawing on the Eccles et al. expectancy value theory of achievement-related choices (Eccles, 2009; Eccles et al., 1983), Eccles and her colleagues have assessed the association of math, physics, and biological ability self-concepts, interests, perceived utility value, and prior math achievement with both enrollment in advanced math and science courses in high school and college major. Similar to the studies reviewed in the previous paragraph, they found a strong association of prior math achievement and math and science ability self-concepts (similar to self-efficacy) with both high school enrollment in advanced math and physics courses and college major. Of interest, they found an even stronger association of the perceived utility value of math and physics with high school course enrollment decisions, suggesting that high school students are already selecting their courses based on their long-term career goals (Eccles, 2007; Eccles et al., 1999; Updegraff, Eccles, Barber, & O'Brien, 1996; Watt, Eccles, & Durik, 2006). Furthermore, in Updegraff et al. (1996), the gender differences in the perceived utility value of math and physics fully accounted for the gender differences in these students' high school math and physics course taking. Eccles and her colleagues have also found a strong association of interest in math with high school and college major (Eccles, 2011; Nagy et al., 2008; Updegraff et al., 1996; Watt et al., 2006). Finally, they found that the desire to have a job that helps people at age 20 is a very strong predictor of both women and men choosing to, and completing, a major in the biological rather than the physical sciences and math (Eccles, 2009, 2011). Endorsing this job value also discriminated between working in biological/medical and physical/engineering science occupations at age 25. As one might expect, women are much more likely than men to both express this occupational value, to major in the biological rather than the physical/engineering sciences, and to be employed in the biological/medical rather than the physical/engineering sciences (Eccles, 2011). Of interest, the desire to have a flexible job (a value endorsed more strongly by young women than by young men) did not explain the gender differences in majoring in either the biological or physical/engineering sciences or in the likelihood of being in either biological or physical/engineering occupations at age 25.

Several other studies have also examined losses of women further along the STEM pathway (Lee, 2002; Sonnert, Fox, & Adkins, 2007; Van Leuvan, 2004, Watt, 2008). Concannon and Barrow (2010) found that men's perceived ability to complete required courses predicted their persistence, whereas women's persistence depended on whether they believed they were capable of getting good grades. Cross (2001) found no gender difference in ability among engineering and natural science graduate students but found women rated their abilities lower than men. Studies of women who were further along the STEM pathway found gender differences in work preferences, life values, and personal views on occupations (Ceci & Williams, 2010; Eccles,

2009, 2011; Ferriman, Lubinski, & Benbow, 2009; Ginther & Kahn, 2006; Goulden, Frasch, & Mason, 2009). In a longitudinal study of top STEM graduate students and high-potential students, Ferriman et al. (2009) discovered that, among top STEM graduate students, men and women were similar in their commitment to work in their mid-20s but diverged after that age. In both samples, men showed greater commitment to working longer hours and women (particularly mothers) expressed more desire for a flexible work schedule and a shorter work week (Lubinski, Benbow, Webb, & Bleske-Rechek, 2006).

Xie and Shauman (2003) concluded from their reanalysis of multiple data sets that the widely used pipeline metaphor is inaccurate and perhaps harmful. Like Eccles and her colleagues, they argued for a lifespan approach to recognize the complex process of career decision making and its extension over a number of years, if not decades. They suggested that the pipeline metaphor places too much emphasis on leakage issues and too little on early stage interest development. Consistent with this view, Su, Rounds, and Armstrong (2009) conducted a meta-analysis of standardized measurements of occupational interest. Discovering some gender differences using the Holland (1973, 1985) classification of interests, they found that men scored substantially higher on the *realistic* dimension (physical work and hands-on activities with things), whereas women scored significantly higher on the *social* dimension (working with other people). Men scored slightly higher on the *investigative* dimension (exploring unknowns and solving problems; working independently) on some of the vocational inventories but not on others. In a separate meta-analysis of longitudinal studies, Low, Yoon, Roberts, and Rounds (2005) examined the stability of occupational and vocational interest scales in studies ranging from middle school to age 40. They found that vocational interest scale scores tended to stabilize by the end of high school and remain relatively stable in the following decades. This theme of male interest in *things* and female interest in *people* and *relationships* appears in numerous places throughout the literature. For our final discussion, we return to this issue in greater detail.

Ceci, Williams, and Barnett (2009) reviewed research on biological and sociocultural causes of women's underrepresentation in science and concluded that women's fertility choices and the timing of when to have children, together with sex differences in lifestyle preference and career choice, discourages women from persisting in math-intensive occupations. Mason, Goulden, and Frasch (2009) found that graduate students in math-intensive fields are more likely to shift their plans away from academic careers. For women, the most common reasons given for switching were "issues related to children," "other life interests," and "negative experiences as a Ph.D. student." Although men also cited the last two reasons, "professional activity too time-consuming" took the place of "issues related to children." Similar patterns were found for young men and women as they made the transition into and through college by Frome, Alfeld, Eccles, and Barber (2006). In their study, the young women were more likely than their male peers to shift their occupational goals away from the sciences, and the women's shift was linked to changes in their other life goals, as well as to the relative strength of their occupational goals versus their family goals in high school.

Research on STEM professionals has additionally shown that women with children are often professionally disadvantaged in comparison to their male counterparts. Mason and Goulden (2002) found that having a child early in one's academic career diminishes the chance for a woman to earn tenure. Ginther and Kahn (2006) found that women with children are less likely to advance in academia beyond their early postdoctorate years but that both marriage and children increase the likelihood that a man advances.

LITERATURE: HEALTH AND MEDICAL CAREERS

During the last three decades, the opportunities for young women to enter and graduate from medical school increased significantly. When LSAY participants were in high school, only one third of students admitted and attending medical school were female. Twenty years later, the proportion reached 44%; it currently sits at 48%. Forty-eight percent of medical school graduates in 2009–10 were women (American Association of Medical Colleges, 2010; Barzansky & Etzel, 2010; Beede et al., 2011). The growth in interest in medicine may reflect, in part, changes in medical practice that emphasize group practice and give physicians greater control over their schedule.

Women comprise an even larger percentage of veterinary professionals than medical professionals with large increases over the last 40 years. In 1970, only 8% of practicing veterinarians were women. By 2008, nearly half of all veterinarians were women, as were 79% of applicants to veterinary schools (Irvine & Vermilya, 2010).

Although representing a smaller percentage than some other health and medical professions, women have made gains in dentistry. In 1982, only 3% of dentists in the United States were women, but by the end of the century, this had increased to 13%, with projections of 28% by 2020. The proportion of female dental students has increased from 24% in 1982 to 40% in 2002 (Walton, Byck, Cooksey, & Kaste, 2004). By 2007, 47% of the applicants to dental schools were women (Okwuje et al., 2008).

These patterns are consistent with the patterns of vocational and career interests found by Su et al. (2009) in their meta-analysis of the literature. Women and men were similar in their level of investigative and inquiry motivations, but men, in general, were less comfortable in working with people than things, and more women were attracted to working with people in social settings than were men. As noted earlier, women's desire to work with people and to do work that directly benefits people was a very strong discriminating factor in whether "science and math-able" women went into the biological/medical sciences rather than the physical/engineering sciences (Eccles, 2009, 2011). Eccles's (1994) general model of career choices suggested that both men and women will be more attracted to occupations that allow them to fulfill their long-term goals and to express their social identities. To the extent that the medical sciences and professions fit better with women's social identities than the physical/engineering sciences, "math and science-able" women should be more likely to select professions in the medical sciences. Similarly, to the extent that the physical/engineering sciences fit better with men's than with women's social identities and value systems, men should be more likely than women to go into these fields. Eccles (2009), and others, also suggested that young women were more interested in balancing work and family obligations than young men; Frome et al. (2006) confirmed this prediction. Perhaps the structural changes in the practice of medicine, dentistry, and veterinarian medicine made those professions relatively more attractive to the twin goals of family and work than more traditional academic research careers in STEM fields.

METHODS

This article uses data from the full 20-year record of the LSAY (see Miller & Kimmel, 2012/*this issue*, for a full description of the LSAY and the variables used in this analysis). We examine gender

differences at major junctures along the pathways to STEMM professions for the total sample and a STEMM talent pool. We use structural equation modeling to study the factors associated with initial enrollment in a STEMM undergraduate major and employment in a STEMM career and simultaneously estimate a structural equation model for men and women using a multiple-group method within LISREL 9.0 (Jöreskog & Sörbom, 1993). The multiple-group method produces estimates on a common metric that allows for a comparison of the size of paths and the total effects of variables in the model on men's and women's enrollment in a STEMM major and employment in a STEMM career.

RESULTS

There are several milestones on the path to a STEMM profession where researchers have found distinct gender differences, including completion of mathematics coursework in secondary school, entry into and completion of STEMM undergraduate studies, entry into and completion of STEMM graduate studies, and of course participation in the STEMM workforce. Although there were no gender differences in enrollment in eighth-grade algebra for the total LSAY sample, boys were more likely to enroll in calculus (13% vs. 7%; see Table 1).¹

The Conceptualization and Measurement of the STEMM Talent Pool

Numerous articles and reports refer to a talent pool for careers in science, technology, engineering, and medicine (Clewell, Cosentino de Cohen, Tsui, & Deterding, 2006; Committee on Equal Opportunities in Science and Engineering, 2004; National Science Board, 2010a; Tsui, 2007). Eccles (1994) referred to an "intellectually capable" population. We defined the high school STEMM talent pool as those students graduating from high school who are prepared to enroll in postsecondary STEMM studies. To be included in the STEMM talent pool, a LSAY student met at least one of the following conditions: (a) top quintile of mathematics achievement, (b) top quintile of science achievement, (c) enrolled in calculus in high school, or (d) enrolled in algebra in eighth grade. These conditions represent four critical academic gateways on the path to a STEMM profession. Eccles and others (Su et al., 2009; Xie & Shauman, 2003) have argued that interest and longer term goals influence student decisions about course and program selections. Although we do not dispute that argument, interest alone is not sufficient. One also needs to have sufficient talent and/or training to enter these professions. The factors we have included in the computation of the STEMM talent pool present these necessary characteristics. Although a middle school student may express a high level of interest in a career in engineering, if they do not take high school calculus and have low levels of mathematics achievement, it is unlikely that they will fulfill that desire.

Using this metric, approximately one third of all high school graduates were classified as being in the STEMM talent pool by the end of high school, including 39% of young men and 28% of young women (see Table 1). There was no significant gender difference in enrollment in

¹Gender differences in enrollment and performance have narrowed since the LSAY participants were in school (Clewell & Campbell, 2002; Huang, Taddese, & Walter, 2000).

TABLE 1
Progression from Eighth-Grade Algebra to the STEMM Workforce

	All Participants		STEMM Talent Pool	
	Male	Female	Male	Female
STEMM talent pool				
Algebra in 8th grade	14%	12%	35%*	43%
Calculus in HS	13*	7	33*	27
HS math achievement top quintile	28*	19	71	69
HS science achievement top quintile	30*	17	76*	62
STEMM talent pool at end of HS ^a	39*	28	100	100
Undergraduate major				
Enrolled in any postsecondary school	75*	80	93*	97
Completed baccalaureate in any field	40*	46	68*	76
Enrolled STEMM undergraduate major	26*	21	41*	29
Completed STEMM undergraduate major	14	12	29*	23
Science major	6	5	14*	10
Mathematics major (including statistics)	1*	0	1	1
Engineering major	5*	1	11*	3
Health-related major	2*	6	3*	9
Graduate major				
Enrolled STEMM MS/prof/PhD	6	5	13	10
Completed STEMM MS/prof/PhD	5	4	12	9
STEMM qualifications ^b				
Qualified for STEMM profession	12*	5	25*	12
STEMM BS, qualified STEMM support	4*	8	7*	12
No STEMM BS, not qualified STEMM	84*	87	68*	76
STEMM employment				
Employed in a STEMM prof. (all fields)	10*	4	21*	10
Employed in STEMM prof.: science or math	4*	1	7*	3
Employed in STEMM prof.: engineering	3*	<1	7*	1
Employed in STEMM prof.: medicine/health	3	3	7	6
Employed in STEMM support occupation	6	6	7	5
Business and public administration	22*	14	26*	19
Teacher (precollege)	1*	7	2*	9
Other occupation (sales, clerical, etc.)	43*	33	26*	20
Out of workforce	10*	26	7*	21
No. of participants	2,010	1,935	772	535

Note. STEMM = science, technology, engineering, mathematics, and medicine; HS = high school; prof. = profession.

^aThe STEMM Talent Pool has one of the following: eighth-grade algebra, high school calculus, top quintile science achievement, or top quintile mathematics achievement. ^bThe qualifications for a STEMM Profession are a BS in engineering or computer science, or a graduate degree in science, mathematics, engineering, or medicine.

*Significant difference in proportion, $p < .05$, based on gender.

eighth-grade algebra, but male high school students were more likely than female high school students to score in the top quintile of science and mathematics achievement tests; male students were also more apt to complete calculus in 12th grade. These early course decisions and differences in achievement scores represent the first narrowing of the opportunities for young women on the pathway to a STEMM profession. However, it should be noted, it is possible for young

women to be recruited into many scientific fields during the 1st year of college, but exercising this option is not easy (see Xie & Shauman, 2003).

Post-High-School Gateways to a STEMM Profession

By identifying a STEMM talent pool at the end of high school, we were able to use the 23-year record of the LSAY to examine gender differences at major postsecondary milestones for both the entire sample and those with academic preparation for a STEMM profession.

Enrollment in an appropriate postsecondary education (PSE) program and major is the first critical post-high-school gateway. Men in the total sample and the talent pool were significantly more likely than women to initially enroll in a STEMM major when they first entered a PSE program (see Table 1). Among students in the high school STEMM talent pool, 41% of male students and 29% of female students enrolled in a STEMM-related major at the PSE level. It is important to note that a higher proportion of all female students (80%) and of female students in the talent pool (97%) enrolled in a PSE program than male students in the total population or in the talent pool, respectively. These results demonstrate that female high school graduates, although choosing major fields other than STEMM, enrolled in colleges and universities at higher rates than male graduates and were more likely to graduate with a baccalaureate. Although they were not as attracted to the STEMM professions, young women displayed a high level of completion in non-STEMM programs like business, law, education, and the arts and humanities.

Earning a baccalaureate in a STEMM-related field is an essential second step toward a STEMM profession. Although the percentage of young men and women completing a baccalaureate in a STEMM field was not significantly different for the total population of LSAY students (14% vs. 12%), the proportion of young men in the talent pool that completed a STEMM-related baccalaureate (29%) was significantly higher than the proportion of young women (23%) who completed a similar degree. The role and importance of completing a baccalaureate in a STEMM field varies by the area of specialization and this variation contributes to some confusion in describing and thinking about gender differences under the broader STEMM category. Five percent of all male young adults and 11% of men in the talent pool completed a baccalaureate in engineering; in both our analysis and the career literature, an individual employed as an engineer with a baccalaureate in engineering is considered a STEMM professional. Only 1% of all female students and only 3% of women in the talent pool completed a baccalaureate in engineering. The underrepresentation of women in the engineering profession is substantial and appears to be continuing (Adelman, 1998; Concannon & Barrow, 2010; Cosentino de Cohen & Deterding, 2009; Pearson & Miller, 2012/*this issue*).

In contrast, for students seeking a professional career in science, mathematics, or medicine, the baccalaureate is only an intermediate gateway on a longer path toward a graduate or professional degree. Some baccalaureate fields in health (nursing, laboratory technicians, therapists, and counselors) are classified as STEMM support occupations rather than STEMM professions, and young women are significantly more likely to enter these health-related STEMM support occupations than young men (Fuchs & Miller, 2012/*this issue*; Miller & Solberg, 2012/*this issue*). These classification decisions confound the meaning of a baccalaureate in a STEMM field and can lead to inaccurate conclusions if not fully understood.

In both the total young adult population and in the STEMM talent pool, young men were slightly more likely than young women to enter and complete a graduate program in a STEMM field, but the magnitude of this difference in neither the total population nor the talent pool was statistically significant at the .05 level (see Table 1). Although several studies have reported significant differences in male and female persistence in graduate studies, our research did not support that conclusion. One of the reasons for this finding is that many of the studies in the literature have focused on only the STEM professions excluding medicine and health, and this analysis used a broader definition of STEMM professions that included medicine and the health professions. This pattern is consistent with the work of Eccles (1994, 2011); Eccles and Jacobs (1986); and Su et al. (2009) suggesting that a higher proportion of women prefer careers that involve working with people but that there are no gender differences in interest in careers that involve investigation and inquiry. As we argue in our concluding discussion, the emerging structure of medical and health practices offer many young women an opportunity to pursue a profession that involves both scientific inquiry and personal and social interactions.

The final gateway is employment in a STEMM profession. The aggregate data on gender differences in STEMM employment at the professional level are misleading. Looking at all STEMM professions, 10% of all LSAY young adult men achieved employment as a STEMM professional compared to 4% of LSAY young women (see Table 1). Among the STEMM talent pool, 25% of young men entered a STEMM profession compared to 12% of young women. These results reflect in large part the substantial gender differential in employment as a professional engineer. If the fields classified as STEMM support were reclassified, the apparent gender difference would be substantially reduced. There is no statistical difference between young women and young men in employment in the medical and health professions.

Nonacademic Barriers to Employment in a STEMM Profession

The literature indicates that the demands of family and children are major nonacademic barriers for women on the pathway to a STEMM profession. Previous analyses have found that young women often fail to pursue a STEMM profession or opt out of the process due to family concerns such as child care (Ceci et al., 2009; Dorsey, Jarjoura, & Rutecki, 2003; Eccles, 1994; Lee, 2002; Mason & Goulden, 2002; Xie & Shauman, 2003). The two-decade longitudinal record of the LSAY provides an opportunity to estimate the impact of family and children on a young woman's eventual employment in a STEMM profession.

The LSAY data indicate that among women and men who have academic qualifications for a STEMM profession, there is no statistically significant difference in the likelihood of professional STEMM employment, regardless of whether individuals have children at home or not (see Table 2). There is also no significant gender difference in being out of the workforce, either as a stay-at-home parent or due to job loss or other reasons, among those qualified for a STEMM profession. Previous research findings in the literature of gender differences in STEMM employment based on children at home may have reflected a focus on traditional STEM disciplines, in the process excluding the health and medical professions. Including medical professions in the research reduces or eliminates the previously observed differential.

TABLE 2
Employment in a STEMM Profession by Educational Qualifications and Minor Children at Home

	Employed in . . .			Not Employed	N
	STEMM Profession	STEMM Support	Other Occupation		
All participants with a BS or higher with qualifications ^a for a STEMM profession					
All female	78	2	11	9	105
All male	80	2	13	5	235
Female, no children in home	80	0	15	5	39
Female, children in home	76	3	9	12	66
Male, no children in home	77	2	11	10	101
Male, children in home	82	3	14	1*	134
STEMM talent pool ^b with a BS or higher with qualifications ^a for a STEMM profession					
All female	80	2	12	6	66
All male	82	3	10	5	190
Female, no children in home	79	0	17	4	29
Female, children in home	78	3	8	11	37
Male, no children in home	80	3	6	11	80
Male, children in home	83	3	14	0*	110

Note. STEMM = science, technology, engineering, mathematics, and medicine.

^aThe qualifications for a STEMM profession are a baccalaureate degree in engineering or computer science, or a graduate degree in science, mathematics, engineering, or medicine. ^bThe STEMM talent pool includes individuals who have one of the following: enrolled in algebra in eighth grade, enrolled in calculus in high school, top quintile in science achievement, or top quintile in mathematics achievement.

*Significant difference in proportion, $p < .05$, based on gender.

The Construction of Structural Models to Examine Gender Differences

Given the observed gender differences discussed in the preceding sections of this analysis, we turn to an exploration of gender differences in factors along the pathway to a STEMM profession. Earlier we outlined gender-based differences in occupational objectives and in the rationale for selecting specific courses, majors, and ultimately careers. The general models offered by Miller and Kimmel (2012/*this issue*) earlier in this issue and by Eccles and her colleagues early in the 1980s treated gender as just one variable in a larger model. Miller and Kimmel (2012/*this issue*) found a significant associated effect—young women were significantly less likely to join a STEMM profession than young men. But the work reviewed earlier suggests that the gendered choices are influenced by the several other constructs in each of these models. In the context of the preceding discussion, and of selected bivariate tabulations from the LSAY data set, we now use two two-group structural equation models to estimate the influence of each of several variables on the likelihood that young men and young women would enter into a STEMM profession.

Reflecting the general socialization literature and the literature on the influence of parents and teachers on student thinking about the STEMM professions (see Eccles, 1993), the first model examines the influence of a set of parental, home, and school factors on initial enrollment in postsecondary STEMM programs. Although several of the preceding analyses in this issue have used structural equation models to explore the relationship of parental, home, and school

influences, this is the first use of a two-group model in this set of analyses. For readers not familiar with this technique, we discuss briefly the nature of and rationale for the use of a two-group structural equation model. A two-group model allows the testing of various common and different structures for each of the two groups—in this case, men and women—to provide the best estimates and best fit for each group. By combining the men and women into a two-group analysis, LISREL is able to compute the estimated path coefficients and total effects on a common variance pool, making these coefficients directly comparable (Hayduk, 1987). If we were to run separate models for young men and young women in a pair of single-group models, we would be able to obtain path coefficients and total effect estimates for each group, but a comparison of path coefficients or total effects from the two separate models would be problematic. Each model would have its own variance pool and the nature of the variance or covariance with the separate models might influence the estimates. A two-group model eliminates variance or covariance issues inherent in the comparison of single group models.

A second two-group model extends the initial two-group models to incorporate post-high-school variables for young women and young men. Although the educational and early occupational experiences of young women and young men have grown increasingly similar in recent decades, it is important to explore the possibility that there are structural differences in the ways that young women and young men experience common events. The first two decades after high school are a period in which many young adults in the LSAY finish their formal schooling, make decisions about occupational and professional goals, take steps toward having children and families, and become citizens and neighbors in a community. These are powerful socialization experiences and may reinforce or change earlier career plans and expectations. The 23-year record of the LSAY allows a full exploration of these factors during the first two decades after high school.

Model 1: Initial Enrollment in STEMM Major

To understand the factors that influence a student to enroll in a STEMM major in a postsecondary program, this model begins with a set of parental and home variables—parent education, parent occupation, parent college push, and parent math-science push. The model then examines the structure of these influences for young women and young men (see Figure 1). A second set of variables reflects student skills and activities—student reading level and student exposure to home learning resources (books, computers, microscopes, telescopes, etc.). A third set of variables focuses on student course enrollment decisions as well as the development of competence in science and mathematics—eighth-grade algebra, math teacher encouragement, science teacher encouragement, attitudes toward math, attitudes toward science, achievement test scores in science, achievement test scores in math, and enrollment in high school calculus. We assessed all of these secondary school experiences in terms of their impact on a student's plans to initially enroll in a postsecondary STEMM program.

The paths and path coefficients² in Figure 1 indicate that structural differences and substantial structural similarities exist for both men and women. Better-educated parents of both boys and

²All of the paths in Figure 1 are significant at the .05 level or better; the absence of a path between two variable means that the relationship was not significant at the .05 level.

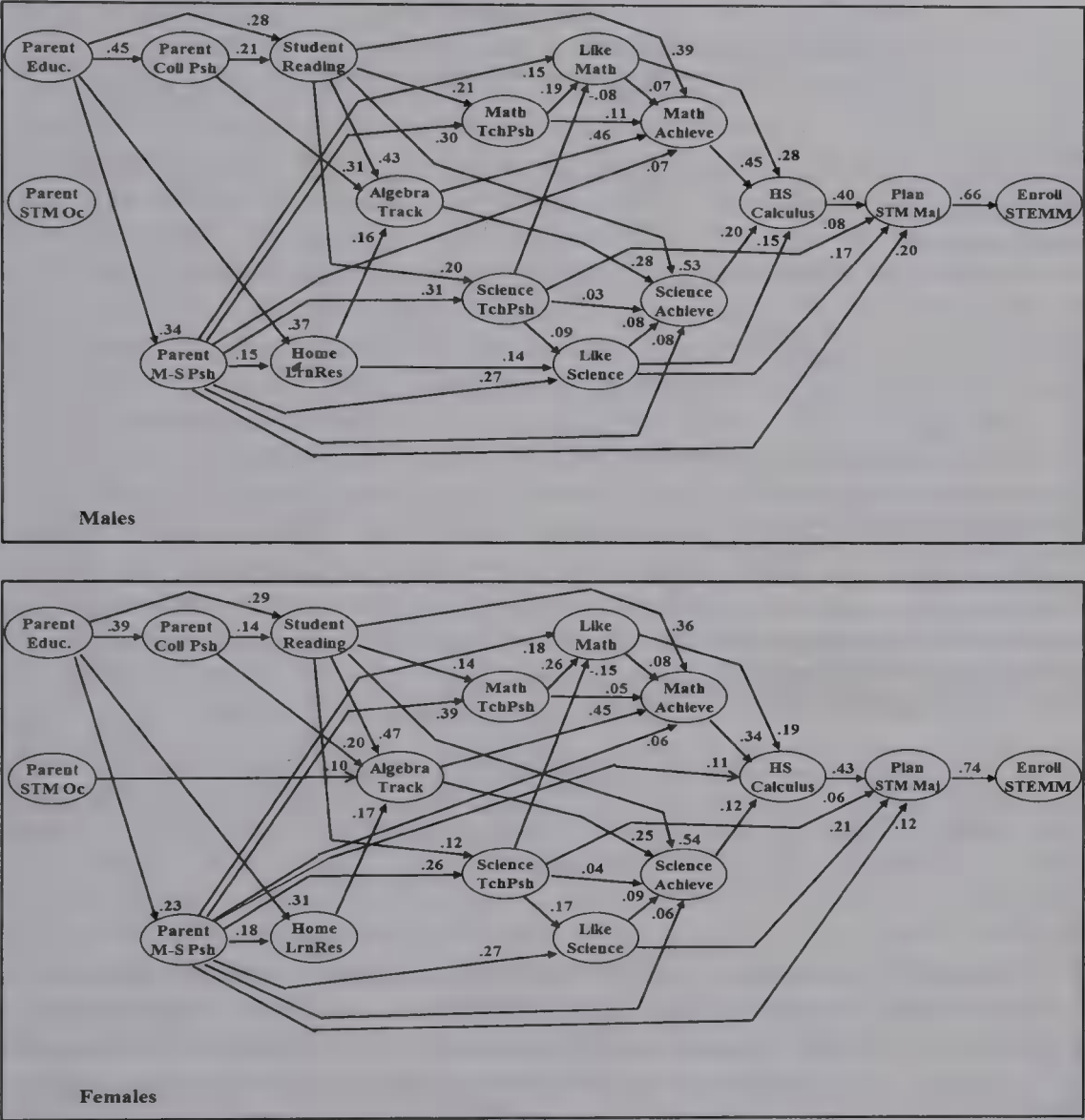


FIGURE 1 Model to predict initial enrollment in a science, technology, engineering, mathematics, and medicine (STEMM) major.

girls provide more encouragement to go to college than less educated parents. In addition, there was a positive relationship between the level of parent education and student reading level for both genders. Placement in eighth-grade algebra was positively related to high school math achievement by Grade 12 for both boys and girls (0.46 and 0.45, respectively), and the completion of high school calculus was strongly related to plans to enroll in a STEMM major in college (0.40 and 0.43, respectively). There were, however, some interesting differences. The availability of home science learning resources (computers, microscopes, telescopes) was weakly related to young men’s liking of science (0.14) but was unrelated among young women.

One of the benefits of structural equation models is that they allow us to estimate the total effect of each variable in the model on any other variable in the model by multiplying the path

TABLE 3
Total Effects of Selected Factors on Initial Enrollment in a STEMM Major

Variables in Model	STEMM Enroll	
	Male	Female
Home and family		
Parent education	.13	.09
Parent employment in a STEMM field	.00	.00
Parent college push during HS	.05	.03
Parent math-science push during HS	.20	.21
Home science learning resources	.02	.01
Student reading ability in HS	.12	.10
Secondary schooling		
Student algebra track middle school and HS	.07	.06
Science teacher encouragement HS	.05	.06
Mathematics teacher encouragement HS	.03	.02
Student liked science as a subject in HS	.05	.12
Student liked mathematics as a subject in HS	.08	.07
Student science achievement score, Grade 12	.05	.04
Student math achievement score, Grade 12	.12	.11
Student completed calculus course in HS	.26	.32
Student planned to major in STEMM in college	.66	.74
<i>R</i> ²	.47	.50

Note. Fit statistics: *df* = 152; χ^2 s = 1306.2 (*p* = .00); root mean square error of approximation (RMSEA) = .027; 90% confidence interval (RMSEA) [.024, .031]; *N* = 1,854 (male); 1,809 (female). STEMM = science, technology, engineering, mathematics, and medicine; HS = high school.

coefficients and then summing across all possible paths between any two variables in the model (Hayduk, 1987). In a two-group model, we can estimate the total effect of each variable within each group on the outcome variable—initial enrollment in a STEMM major. From there we can begin to compare these results (see Table 3). For example, the level of parent education was weakly related to student initial enrollment in a STEMM major, and the gender differential was not significant (0.13 for men and 0.09 for women). Similarly, parent employment in a STEMM occupation was unrelated to initial STEMM enrollment for both men and women.

The most striking aspect of this comparison is that the total predictive impact of parental, home, and secondary school influences shows no major structural differences between female and male students. Each of the models accounts for roughly half of the total covariance in the model, and none of the total effects differed substantially across genders. This result suggests that socialization literature’s earlier findings—that significant differences existed in the home and school experiences of young women and young men—are no longer true for these cohorts. By the 1980s, there had been a good deal of attention by both academics and practitioners to the gender differential in science and mathematics, and many teachers may have participated in workshops addressed to gender equity. Although the data do not specify the origin of these changes, the results reveal a general shift from the older gender encouragement patterns found in earlier literature in which men and women received differential levels of encouragement in math and science.

Model 2: Employment in a STEMM Profession

Having found few systemic differences in the effect of home and school socialization of young women and young men on their initial enrollment in a STEMM major, we turned to a second model, which built on the earlier previous model and extends it to include a variety of postsecondary experiences. Our second model sought to utilize the combination of precollege and postsecondary experiences to predict employment in a STEMM profession 20 years after the completion of high school. We added separate measures for the number of college science courses completed and the number of college calculus courses completed. The extended model also included a measure for the completion of a baccalaureate and a graduate or professional degree in a STEMM-related field. The outcome variable for this model was a young adult's employment in a STEMM profession by the end of his late 30's (see Figure 2). This second model carried forward the two-group analysis of young women and young men. A visual examination of the two path diagrams indicates a basic similarity between the two models (see Figure 2). Further examination of the two models' total effects, however, points to more areas of difference in the relative effect of various factors on employment in a STEMM profession for men and women than in the precollege model. Some of the precollege variables that did not vary for boys and girls in high school displayed a significant impact 20 years after high school. Parent math and science push measures the level of overt parental encouragement of science and mathematics during secondary school. Its total effect on initial STEMM postsecondary enrollment was 0.20 for high school boys and 0.21 for high school girls—virtually the same. Twenty years later, the total effect of parent math and science push on employment in a STEMM profession was 0.15 for young men and 0.05 for young women—a significant difference. We observed similar patterns for the influence of eighth-grade algebra, student attitude toward science, and student attitude toward mathematics (see Table 4). These results indicate that the early influence of parents had longer term effects for young men than young women. Or, conversely, these results could indicate that young women were more likely to experience other factors during the two decades after high school that changed or offset their original interest in a STEMM profession. The data do not allow us to choose between these interpretations, but both interpretations indicate that postsecondary experiences may have more impact on young women than young men.

Portions of the results are directly related to the high proportion of young men and the low proportion of young women who enter engineering. At the end of high school, completing a high school calculus course had a total effect on initial enrollment in a STEMM college major of 0.32 for young women and 0.26 for young men, a small difference tilting toward women. Twenty years later, the influence of completing a high school calculus course on being employed as a STEMM professional was 0.28 for young men and 0.09 for young women (see Table 4). The impact of the number of completed college calculus courses on employment in a STEMM profession was 0.35 for young men and 0.11 for young women. These results reflect the high proportion of young men entering engineering and the strong predictive relationship between calculus courses and engineering. For similar reasons, the total effect of an undergraduate STEMM major on employment in a STEMM profession was 0.72 for young men and 0.42 for young women, which again reflects the inclusion of baccalaureate engineers as STEMM professionals. The importance of graduate and professional degrees in nonengineering professions is shown by the influence of a graduate or professional degree on employment as a STEMM professional—0.75 for young women and 0.47 for young men (see Table 4).

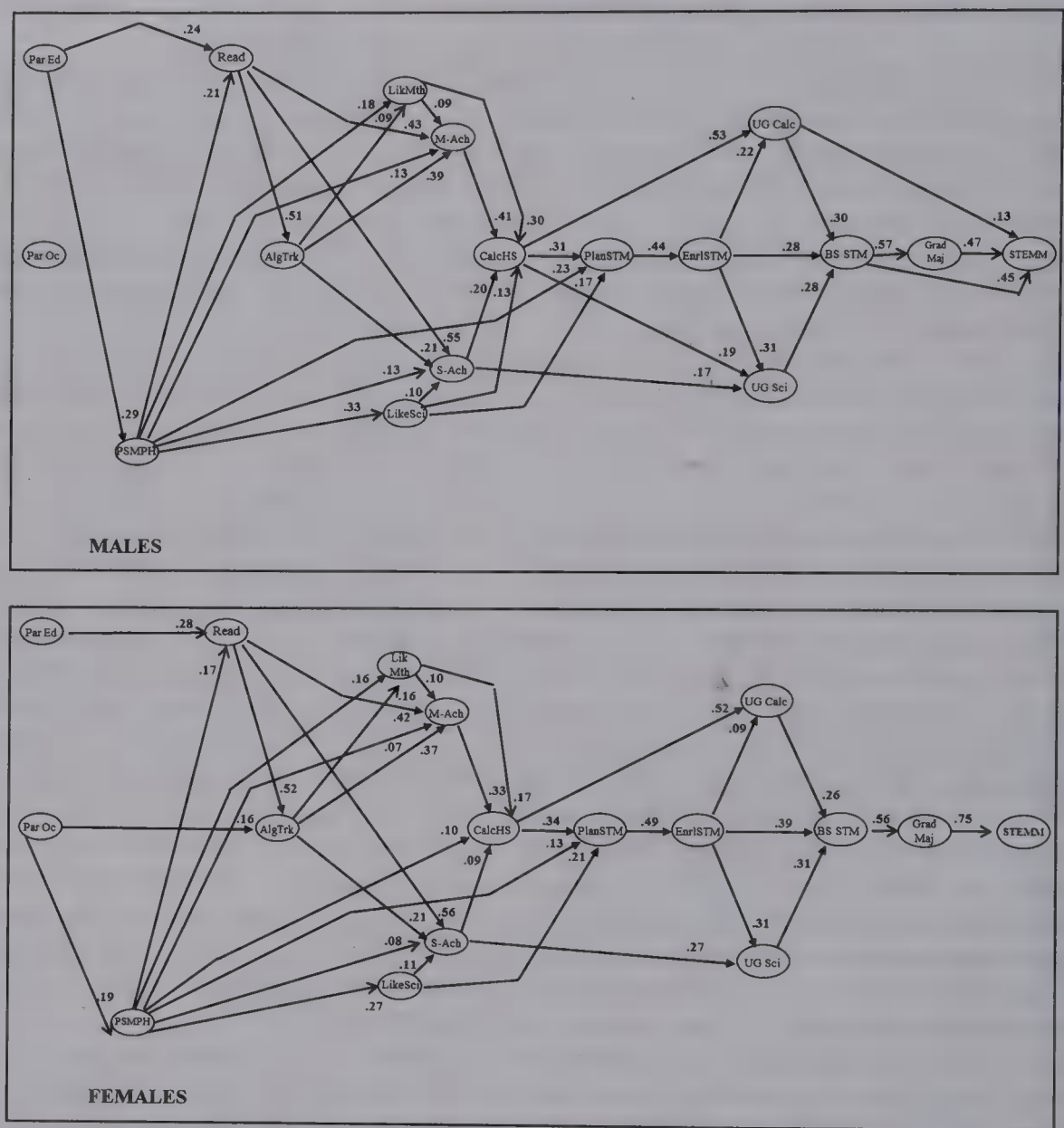


FIGURE 2 Model to predict current employment in a science, technology, engineering, mathematics, and medicine (STEMM) profession.

DISCUSSION

This article has focused on the presence of gender differences in the selection of and employment in a STEMM profession. We concur with Xie and Shauman (2003) and Eccles (1994, 2009) that the factors influencing an individual’s entrance into a STEMM profession are complex and require a lifespan perspective. The two-decade record of the LSAY provides an important opportunity to reexamine what we know about this process and to identify the major factors that may be susceptible to meaningful change in the foreseeable future.

TABLE 4
Total Effects of Selected Factors on Employment in a STEMM Profession

Variables in Model	STEMM Profession	
	Male	Female
Home and family		
Parent education	.07	.01
Parent employment in a STEMM field	.00	.01
Parent math-science push during HS	.15	.05
Student reading ability in HS	.14	.05
Secondary schooling		
Student algebra track middle school and HS	.08	.02
Student liked science as a subject in HS	.08	.03
Student liked mathematics as a subject in HS	.09	.02
Student science achievement score, Grade 12	.09	.05
Student math achievement score, Grade 12	.12	.03
Student completed calculus course in HS	.28	.09
Student planned to major in STEMM in college	.15	.10
Undergraduate experience		
Student initial enrollment in PSE STEMM program	.34	.21
No. of student college calculus courses	.35	.11
No. of student college science courses	.20	.13
Student undergraduate major in STEMM field	.72	.42
Graduate experience		
Graduate major in STEMM field	.47	.75
R^2	.62	.80

Note. Fit statistics: $df = 196$; $\chi^2_s = 1660.0$ ($p = .00$); root mean square error of approximation (RMSEA) = .038; 90% confidence interval (RMSEA) [.034., .041]; $N = 1,407$ (male); 1,447 (female). STEMM = science, technology, engineering, mathematics, and medicine; HS = high school; PSE = postsecondary education.

Our analysis leads to five main conclusions. First, that the pathway metaphor is more useful than the pipeline metaphor when discussing a young adult's pursuit of a STEMM profession. This is especially applicable for the analysis of gender differences. Pathways have detours, rest stops, and alternative routes to the same objective, whereas pipelines tend to have a single direction, and alternative choices are characterized as leaks. We see this as more than a semantic difference. The traditional model of a concentrated period of initial education followed by decades of continuous work fails to describe an increasing number of professions. Many labor market analysts expect that new entrants to the professional work force should expect to stop-out and retool once or twice during their career, which is likely to extend into their early 70s or beyond. The flexibility inherent in the pathways metaphor makes it a better model for this growing trend.

Second, our structural equation models of initial enrollment in a STEMM field found that the influence of family, teachers, and school success was similar for boys and girls in the LSAY cohorts. More young women than young men acquired the academic credentials to enter postsecondary study. In addition, more young women than young men earned a baccalaureate. Despite virtual parity in academic achievement and in the STEMM talent pool, by the end of high school, a higher proportion of young men had expressed an intention to major in a STEMM field in college than young women. This is an indication that many young women find the prospect of

a career in law, business, or other non-STEMM fields a more attractive career opportunity. Young women's interest in medicine suggests that professions which combine science and higher levels of social and interpersonal interaction are more satisfying than traditional laboratory science professions or engineering (Eccles, 2009; Eccles et al., 1999; Su et al., 2009).

Third, the analysis indicates that the largest gender differences occur in the field of engineering. Because admission to a baccalaureate program in engineering often requires a separate application process, the decision to pursue an engineering career takes root in high school. Young men's early preference for engineering may reflect a generally masculine interest in workings with things (Eccles, 2007; Su et al., 2009). It may also be responsible for the slightly higher proportion of high school boys who enroll in high school calculus. Xie and Shauman (2003) and others have shown that high school math achievement does not restrict women from pursuing an engineering career; thus the gender difference in engineering appears to be a matter of choice. Compared to scientific and medical careers that may require additional years of graduate or professional study, most professional engineers begin their working career with only a baccalaureate, and they have reasonably constrained work hours and demands. Future research should look carefully at the origins and content of young women's perceptions of engineering. It is also important to reiterate that classifying those bachelor degree science-related professions that employ disproportionately more women (like science teaching and nursing) as science support professions rather than science professions distorts all of these figures. It would be very interesting to look at the factors that discriminate between going into bachelor-degree-level engineering professions and the more female-typed bachelor degree math and science-related professions.

Fourth, for women, the decision to undertake graduate or professional study appears to be a major gateway and a major decision point. Our extended structural equation model found that the total effect of a graduate or professional degree was 0.75 for women and 0.62 for men (see Table 4). In programmatic terms, this decision may determine whether a young person becomes a nonengineering STEMM professional or a STEMM support worker. In health, for example, earning a baccalaureate in nursing and taking a job at a hospital or medical office classifies one as a STEMM support worker, but entering a graduate program and earning a master's degree or a doctorate in nursing classifies an individual as a STEMM professional. A young person with a baccalaureate in chemistry, for example, could decide to take a laboratory job within the industry and become a STEMM support worker, enter a graduate program in chemistry and pursue a professional career, or pursue a graduate degree in marketing and move into a non-STEMM career. These decision points apply to both young men and young women, but our analysis indicates that they are relatively more important for young women than they are for young men. This finding points to potential opportunities for programmatic interventions that could serve to bring more women into a STEMM profession as well as the need to reconsider how we classify various professions.

Finally, among those young adults who have attained the qualifications for a STEMM profession, our analysis finds that children's presence in the home is not related to employment in a STEMM profession. Although Xie and Shauman (2003) found that the presence of children created some disadvantage for women, they were unable to control for the attainment of academic qualifications and they did not include medicine and the health professions in their analysis.

Looking at the full analysis, we have found some areas of encouragement and some areas for potential programmatic interventions to address gender disparities. The virtual absence of strong precollege gender differences in parental push and academic preparation speaks to the changing

attitudes on men and women's roles in STEMM professions. Contrary to earlier literature, we found no gender differences in encouragement by high school science or math teachers. And we are pleased to find no gender difference in employment as a STEMM professional among those young adults who attained the qualifications for one of the STEMM professions.

We are disappointed with young women's low level of interest in engineering and related careers. Math ability is not a barrier to women's employment in engineering (Eccles, 2011; Eccles, Barber, & Jozefowicz, 1999; Xie & Shauman, 2003), but other factors diminish young women's interest in the field, despite the structural advantages of shorter professional preparation and reasonably constrained work hours. The Su et al. (2009) finding of lower female interest in working with things and the Eccles finding of higher female interest in working with people are applicable to the general image of engineering. Many engineering educators and leaders argue that engineers often engage with people and that the *design process* that now dominates engineering obligates engineers to interact with and understand the people for whom they design their products or systems. Despite these arguments, women continue to be underrepresented within the field. Eccles (2011) suggests that engineering schools need to engage in an active PR campaign about the changing nature of the engineering profession in order to make it clear to young women that engineers do work cooperatively with others on problems that have important impacts on the well-being of people. Because engineering has been, and continues to be, a strongly male-dominated field, young women may also perceive the prospective work environment as less friendly and the opportunities more limited. Xie and Shauman (2003) suggested that when women first enter a profession previously dominated by men, they will enter into a period during which the success of those early women who enter the new profession will encourage others to follow in future years, and that the process may take some time.

On balance, we are pleased with the progress that has been made but recognize that more work remains to be done to attain full parity. We are concerned that the increasing length of postdoctoral appointments serves to delay effective entrance into a STEMM profession and that this lengthening of the preparation process may impact young women's career pathways more than young men. Historically, postdoctoral research appointments emerged in part to help bridge supply and demand issues in various scientific fields, but they have become a less expensive source of highly trained research workers. The average length of postdoctoral appointments continues to grow, and recent data from the National Institutes of Health indicate that the average age for the first R-01 award is now slightly older than 40. We caution that some of the progress inherent in our findings is fragile and that the elongation of professional training may not be gender neutral.

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Pathways to STEMM Professions for Students From Noncollege Homes

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In this article we use data from the Longitudinal Study of American Youth to examine the influence of parent education on pathways to science, technology, engineering, mathematics, and medicine (STEMM) professions. Building on a general model of factors related to STEMM education and employment, we employ a two-group structural equation model to examine the factors that predict enrollment in a postsecondary STEMM program and employment as a STEMM professional. The results of this analysis indicate that most of the variables in the two models function in a similar manner, but the levels of parental encouragement, help, and direction vary significantly between college-educated and non-college-educated families. The children of non-college-educated parents were less likely to take algebra in Grade 8, take calculus in high school, and take calculus in college than were the children of college-educated parents. Young adults that grew up in noncollege families were less likely to enter postsecondary education; more likely to begin postsecondary education at a community college; less likely to earn a baccalaureate, graduate, or professional degree; and less likely to become a STEMM professional. The analysis reveals a clear pattern of cumulative advantage and cumulative disadvantage, and the final section of this article discusses the need for educational and public policy leaders to develop strategies and programs to address the substantial differential associated with parent education.

There is little disagreement that the pathway to a STEMM profession begins at home. The substantial literature on socialization and early learning has documented the long-term influence of parents (Berger & Luckmann, 1966; Davis-Kean, 2005; Sexton, 1961; Whiston & Keller, 2004). Several of the preceding analyses in this special issue have found significant parent influence on early interest in and eventual entrance into a STEMM profession (Fuchs & Miller, 2012/this issue; Miller & Kimmel, 2012/this issue; Pearson & Miller, 2012/this issue). In the preceding analyses and in most of the relevant literature, authors treat parent education as one variable within larger models or analyses. Because of this, there has been markedly less focus on parent education's influence on possible differences in the structure of career preference formation or the navigation of the educational pathways to a STEMM profession. Using data from the Longitudinal Study

of American Youth (LSAY), this analysis focuses on differences in pathways to a STEMM profession between households in which no parent has a baccalaureate and households in which at least one parent has a baccalaureate.

The presence or absence of college-educated parents is particularly important to the study of student movement into and along pathways toward employment as a STEMM professional. As earlier analyses have demonstrated, the pathways to a STEMM profession begin early and require navigation through a series of educational gateways. We begin with the general hypothesis that parents without a baccalaureate degree are less likely than parents with a baccalaureate to have the experience and insights necessary to guide their children into appropriate early math and science courses or to provide supplemental support in the form of tutoring, guidance, visits to campuses, or conversations with persons in various STEMM fields. Although neither group of parents is uniform in their backgrounds or their ability to encourage and guide a student toward a STEMM profession, we expect that the proportion of parents able to provide insights, guidance, and supplemental resources will be significantly higher among college-educated parents than parents without a college background.

In this analysis, we use the completion of a baccalaureate by at least one parent as the operational division among parents. The range of experience and background is undoubtedly a continuous distribution, but we expect that this distribution is more bimodal rather than normal in form. The selection of any dividing line will create error among marginal cases near the dividing line, but it is important to conceptualize this division into two groups as representing patterns of parental encouragement and response, rather than a precise measure applicable to each and every parent of an LSAY student.

Building on the work of Pascarella, Kuh, and others (Glasser, Larson, & Borgen, 2004; Horn, Cataldi, & Sikora, 2005; Ishitani, 2006; Lippman et al., 2008; McSwain & Davis, 2007; Nevill & Chen, 2007; Oakes, 1985, 1990; Orland, 1990; Pascarella, Pierson, Wolniak, & Terenzini, 2004; Pike & Kuh, 2005; Rowan-Kenyon, 2007; Spitzer, 2000), this analysis utilizes data from the LSAY to examine (a) the factors that account for the initial decision to seek a baccalaureate in a STEMM field and (b) the factors that predict employment as a STEMM professional 20 years after high school (see Miller & Kimmel, 2012/*this issue*, for a description of the LSAY sample and structure). Additional information about the history and current status of the LSAY can be found at <http://www.lsay.org>.

WHAT IS THE IMPACT OF PARENT EDUCATION ON STUDENT OUTCOMES?

It is useful to begin with an examination of the nature and magnitude of the differences in student educational outcomes associated with differences in parent education. Previous studies (Glasser et al., 2004; Horn et al., 2005; Ishitani, 2006; Lippman et al., 2008; Massey, 2007; McSwain & Davis, 2007; Pascarella et al., 2004; Pike & Kuh, 2005; Rowan-Kenyon, 2007; Spitzer, 2000) have described important aspects of this difference in earlier years and in various populations. Because this analysis is based on the longitudinal record of the LSAY, it is important to examine some of the dimensions of this differential.

One third of LSAY students grew up in homes in which at least one parent had a baccalaureate, and two thirds of LSAY students grew up in households in which neither parent had a baccalaureate

degree (see Table 1). Among college-educated parents, 15% were STEMM professionals and 14% were STEMM support workers, indicating that nearly 30% of LSAY students in college-educated households had the combined advantage of parents with more education and with firsthand experience in the field. In contrast, none of the parents in noncollege households had found employment as STEMM professionals, although 11% were employed as STEMM support

TABLE 1
A Demographic Profile of LSAY Young Adults by Level of Parent Education

	No Parent With a Baccalaureate	One or More Parents With a Baccalaureate
Parent Employment in STEMM field [$G = .57_{(.03)}$]		
Not employed in STEMM field	89	71
Employed in STEMM support	11	14
Employed in STEMM profession	0	15
Parent college push [$G = .44_{(.02)}$]		
0 (low)	11	2
1	17	9
2	45	36
3	23	42
4-5 (high)	4	11
Median	2	3
Parent science-math push [$G = .21_{(.04)}$]		
0 (low)	18	12
1	17	13
2	20	17
3	26	28
4-5 (high)	19	30
Median	2	3
Student attitude toward science		
A	16%	20%
B	38	42
C	16	13
D-F	30	25
Student attitude toward mathematics		
A	17	17
B	41	44
C	12	10
D-F	30	29
Race/Ethnicity		
Hispanic American	9	6
African American	11	6
Asian American	2	7
Other American	70	74
<i>N</i>	2,632	1,288
% of all LSAY students	67%	33%

Note. LSAY = Longitudinal Study of American Youth; STEMM = science, technology, engineering, mathematics, and medicine.

workers. In our multivariate models, we examine the relative influence of parent employment in a STEMM profession or STEMM support occupation within each set of households.

According to the study, college-educated parents provided more encouragement for their child to attend college than noncollege parents, and college-educated parents were more likely to overtly encourage their student to study and do well in science and mathematics in high school (see Table 1). The magnitude of this difference, however, was moderate. On scales ranging from 0 to 5, the median level of parental encouragement for college and parental encouragement for the study of science and mathematics was 2 in noncollege households and 3 in college-educated households. The similarity of these scores reflects strong cultural beliefs in the value of higher education in the United States and in the promise of science and technology among American adults (Miller, 2004; Miller & Inglehart, 2011).

The data from LSAY students indicate that these differences in parental and home encouragement in science and mathematics do not produce radically different attitudes toward science and math. During their secondary school years, LSAY students were asked to report how much they liked the subject matter of each course in which they were enrolled, using a traditional A-to-F grading scale. The results—summed across all of the high school science or math courses taken—indicate that there is no difference in attitudes toward math between students from college-educated and noncollege families (see Table 1), and there is only a very small difference in attitudes toward science courses between students from college-educated and noncollege households. As these results suggest, the modest differences in parent encouragement between college-educated households and non-college-educated households did not translate into significant differences in students' attitudes toward math and science.

The impact of parent education and insight appears most clearly in regard to student enrollment in high school mathematics courses. The children of college-educated parents were more than twice as likely to begin algebra in eighth grade as were students from noncollege homes. These same students were also 3 times more likely to complete a calculus course in high school than students from noncollege families (see Table 2). The importance of high school calculus in gaining entry to postsecondary study in STEMM fields has been documented in other analyses in this issue (Miller & Kimmel, 2012/*this issue*; Pearson & Miller, 2012/*this issue*). These results indicate that parent education has a significant impact on students' secondary school mathematics experiences.

Reflecting these differences in course enrollments, students from college-educated households are twice as likely as students from noncollege households to score in the top quartile on standardized mathematics achievement tests. A similar pattern appears for student scores on standardized science achievement tests. The strong linkage between courses taken and standardized achievement scores has been documented for decades in the results of the National Assessment of Educational Progress and similar tests (National Center for Education Statistics, 2009, 2010, 2011).

A parallel result of parental and home influence occurs in regard to student reading scores. According to the LSAY data, children of college-educated parents are $2\frac{1}{2}$ times more likely to score in the top tier of reading achievement than children from noncollege families (see Table 2). Although the middle ranges of reading ability are quite similar, children from noncollege families are significantly more likely than children of college-educated parents to rank in the lowest tier of reading ability. These differentials in reading resonate throughout a student's years of formal schooling and eventually impact his or her adult work performance. Reading is thus a fundamental advantage.

TABLE 2
Indicators of Academic Achievement and Career Plans in High School

	No Parent With a Baccalaureate	One or More Parents With a Baccalaureate
Algebra track [$G = .44_{(.02)}$]		
No algebra course in HS	15	4
Algebra I in Grades 10–12	32	21
Algebra I in Grade 9	44	54
Algebra I in Grade 8	9	21
High school calculus [$G = .54_{(.04)}$]		
No HS calculus course	94	82
One or more HS calculus courses	6	18
Student reading score		
0–40	41	25
41–60	25	21
61–80	22	24
81–100	12	30
Student math achievement score		
0–59	40	21
60–66	22	16
67–74	21	26
75–100	17	37
Student science achievement score		
0–59	40	23
60–65	21	18
66–72	22	23
73–100	17	36
Student intended college major		
No plans for college	64	41
Non-STEMM college major	19	35
STEMM college major	17	24
N	2,632	1,288

Note. HS = high school; STEMM = science, technology, engineering, mathematics, and medicine.

Reflecting these differences in achievement scores in reading, science, and mathematics, 59% of the children of college-educated parents expected to enroll in college at the end of high school, compared to just 36% of the children of noncollege parents (see Table 2). In their last year of high school, 24% of the children of college-educated parents planned to major in a STEMM field in college compared to 17% of the children of noncollege parents.

In terms of actual enrollment, 67% of the children of college-educated parents enrolled in a 4-year college or university compared to 31% of children from noncollege homes (see Table 3). Forty percent of children from noncollege families began their postsecondary program at a community college compared to 24% of children from college-educated homes. The children of college-educated parents were more likely to enroll in a STEMM major initially than were the children of noncollege parents.

TABLE 3
Indicators Postsecondary Enrollment, Attainment, and STEMM Employment

	No Parent With a Baccalaureate	One or More Parents With a Baccalaureate
Student postsecondary enrollment		
No postsecondary enrollment	29%	9%
Started in community college	40	24
Started in 4-year college	31	67
Student initial PSE major		
No postsecondary enrollment	29	9
Non-STEMM field	50	65
STEMM major	21	26
No. of undergraduate calculus courses		
No college calculus courses	84	63
1–2 college calculus courses	12	24
3 or more college calculus courses	4	13
No. of undergraduate science courses		
No college science courses	48	19
1–4 college science courses	22	26
5–9 college science courses	14	20
10 or more college science courses	16	35
Highest degree completed		
Did not complete PSE degree	60	26
Completed associate degree	9	5
Completed baccalaureate	21	39
Completed graduate/prof. degree	10	30
Employment in a STEMM profession		
Out of work force	19	16
Employed in non-STEMM field	71	66
Employed in STEMM support job	6	5
Employed in STEMM profession	4	13
<i>N</i>	2,632	1,288
% of all LSAY students	67%	33%

Note. STEMM = science, technology, engineering, mathematics, and medicine; PSE = postsecondary education; LSAY = Longitudinal Study of American Youth.

In postsecondary study, students from noncollege households are less likely to take a college calculus course and significantly less likely to take three or more college calculus courses. As several preceding analyses have shown, the number of college calculus courses taken by a student is one of the major predictors of a degree in a STEMM field (Miller & Kimmel, 2012/*this issue*; Pearson & Miller, 2012/*this issue*). Students from noncollege families are also less likely to enroll in college science courses and more likely to take fewer science courses throughout their postsecondary schooling. These course selection patterns translate into substantial differentials in degree completion. Students from college-educated homes are twice as likely to earn a baccalaureate as children from noncollege homes (69% to 31%) and 3 times more likely to earn a graduate or professional degree than students from noncollege homes (30% to 10%). These results suggest a

process of cumulative advantage (Coleman, 1988; Entwisle, Alexander, & Olson, 1997; Heppner & Scott, 2004; Lee & Burkam, 2002; Sexton, 1961).

Twenty years after high school, young adults from college educated families are 3 times more likely to have found employment as a STEMM professional than young adults from noncollege homes (13% to 4%). This is a substantial differential and one that is too often overlooked in discussions of educational policy and the composition of the scientific workforce.

Although sample sizes preclude a detailed analysis of the impact of race and ethnicity in our multivariate analyses, it is important to provide a description of the data that are available. African American and Hispanic American students were disproportionately more likely to be in noncollege families, but there was a distribution of all racial and ethnic groups within each educational group (see Table 1). We return to this subject in our Discussion section.

A PATH MODEL TO PREDICT INITIAL ENROLLMENT IN A POSTSECONDARY STEMM PROGRAM

The preceding review of differential educational outcomes associated with differences in parent education provides some useful insights into the process. It is important, however, to examine the way that these factors work within college-educated and noncollege families. In several of the general models discussed in other articles in this special issue (Fuchs & Miller, 2012/*this issue*; Miller & Kimmel, 2012/*this issue*; Pearson & Miller, 2012/*this issue*), parent education was included as a five-category ordinal variable and the results reflect the influence of parent education within the context of the larger model. But it is plausible to think that the context of college-educated and non-college-educated households may be significantly different and that some variables and processes may function differently in these two environments. At the most basic level, less well-educated parents may use a more limited vocabulary with fewer abstractions than college-educated parents (Berger & Luckmann, 1966). At a more sophisticated level, we might expect that college-educated parents would be able to provide more accurate advice to their children about preparation for college, college choice itself, and program selection at the postsecondary level (Pascarella et al., 2004; Pike & Kuh, 2005).

Enrollment in a postsecondary STEMM program is the first major watershed decision on the pathway to a STEMM profession. Miller and Kimmel (2012/*this issue*) presented a set of two path models to describe this process for the full population of the LSAY—representative of Generation X. They identified a set of factors that accounted for half of the covariance in the decision to enroll in a postsecondary STEMM program and concluded that parent encouragement of science and mathematics, early enrollment in algebra, enrollment in high school calculus, and a clear decision to prepare for a STEMM profession were major predictors of initial enrollment in a postsecondary STEMM program. To examine the influence of these factors within college-educated homes and non-college-educated homes, we employ a two-group structural equation model. This technique examines the structural relationships among the variables in the analysis and, building on a common metric and variance pool, computes path coefficients and total effects that are comparable across the two groups (Hayduk, 1987; Jöreskog & Sörbom, 1993). For a discussion of the logic and interpretation of structural equation models using LSAY data, see Miller and Kimmel (2012/*this issue*).

The model to predict enrollment in a postsecondary STEMM program includes a combination of parental and school variables that capture the range of experiences of most middle school and high school students. The model examines the relative impact of (a) student gender, (b) parent employment in a STEMM field, (c) parent college push, (d) parent math and science push, (e) home science learning resources, (f) student reading skills, (g) student algebra track, (h) teacher encouragement in mathematics, (i) teacher encouragement in science, (j) student attitudes toward mathematics, (k) student attitudes toward science, (l) student achievement score in mathematics, (m) student achievement score in science, (n) student completion of high school calculus, and (o) the presence or absence of student plans for a STEMM career (see Figure 1). A short description of each variable in the model is included in the appendix.

There are interesting and important variations between the two path models shown in Figure 1. For example, parents without a baccalaureate were significantly more likely to encourage their daughters to attend college than their sons (-0.11) and strong science teacher encouragement of students from noncollege homes produced a lower level of positive attitude toward mathematics (-0.20). There are numerous other examples of substantial differences in the magnitude of the path coefficients, which are a reflection of the strength of the relationship. To see the net impact of these various paths, it is possible to compute the total effect of each variable by multiplying the path coefficients from any given variable to the outcome variable—enrollment in a postsecondary STEMM program (Hayduk, 1987).

The models for students from non-college-educated and college-educated homes were generally similar, but there were some important differences in the strength of the total effect of various variables (see Table 4). Gender (male) was a stronger predictor of enrollment in a postsecondary STEMM program for students from college-educated homes than for students from non-college-educated homes (0.11 compared to 0.05).

Math-science encouragement from college-educated parents was a stronger predictor of initial enrollment in a STEMM postsecondary program than similar encouragement from non-college-educated parents (0.29 compared to 0.19). This result is consistent with our expectation that parents with college experience of their own may be able to provide more accurate and strategically valuable guidance and encouragement to their children than parents without this kind of experience.

The influence of a completed high school calculus course on enrollment in a postsecondary STEMM program was stronger for the children of non-college-educated parents (0.50) than for the children of college-educated parents (0.15). The magnitude of this difference appears to reflect the smaller number of students from noncollege homes that completed a calculus course in high school and the higher proportion of those students who eventually elected to pursue a STEMM profession. A higher proportion of students from college-educated families took calculus as preparation for careers in business, economics, and other disciplines and professions, whereas children of non-college-educated parents chose to take calculus as preparation for STEMM professions specifically.

This two-group model suggests that the influence of specific variables in college-educated and noncollege homes is similar—that is, the relative influence of parent encouragement of science and mathematics—but that the advantage of prior educational experience is substantial, producing significant differences in the educational attainment. Although the data used in these models do not provide a detailed portrait of the precise ways that better educated parents foster higher levels of educational attainment and stronger interest in STEMM fields, the cumulative effect is evident in the results shown in Tables 1 to 3. These results confirm that parent education levels

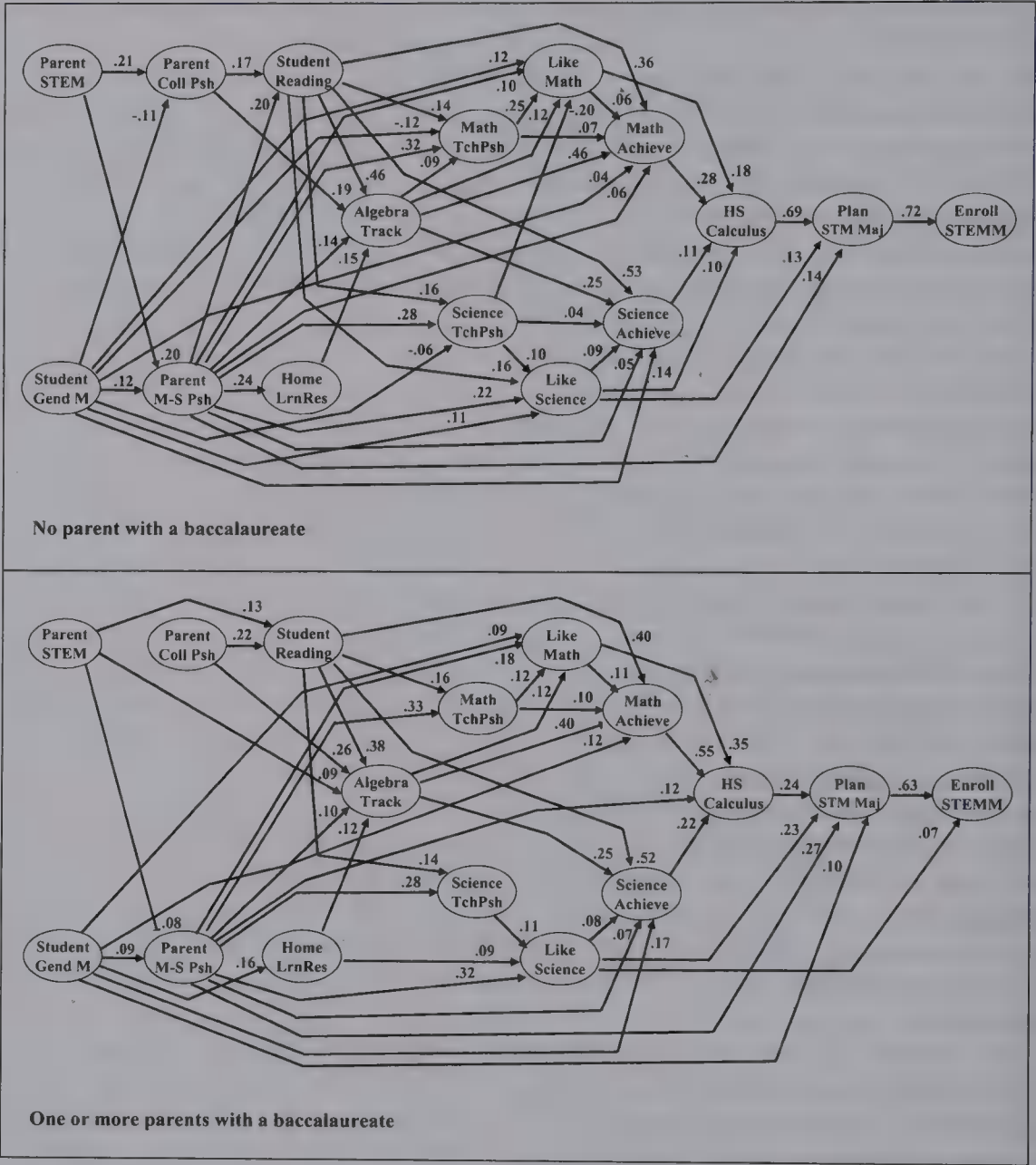


FIGURE 1 Path models to predict enrollment in a postsecondary science, technology, engineering, mathematics, and medicine (STEMM) program.

are strongly associated with initial enrollment in a STEMM program. Both models account for approximately half of the total covariance in the variables included in the models.

A PATH MODEL TO PREDICT EMPLOYMENT IN A STEMM PROFESSION

The preceding analysis examined the pathways through high school and to initial enrollment in a STEMM postsecondary program in a community college, senior college, or university. We found substantial differences between students from college-educated homes and non-college-educated

TABLE 4
Total Effects of Selected Variables on Enrollment in a Postsecondary STEMM Program

Variables in Model		No Parent With a Baccalaureate	One or More Parents With a Baccalaureate
Gender	Student gender (male)	.05	.11
Home and family	Parent employment in a STEMM field	.05	.04
	Parent college push during HS	.04	.03
	Parent math-science push during HS	.19	.29
	Home science learning resources	.01	.03
	Student reading ability in HS	.13	.07
	Student algebra track middle school and HS	.09	.05
Secondary schooling	Science teacher encouragement HS	.00	.02
	Mathematics teacher encouragement HS	.03	.02
	Student liked science as a subject in HS	.07	.22
	Student liked mathematics as a subject in HS	.10	.06
	Student science achievement score, Grade 12	.06	.03
	Student math achievement score, Grade 12	.14	.08
	Student completed calculus course in HS	.50	.15
	Student planned to major in STEMM in college	.72	.63
R ²		.47	.51
N		2,478	1,185

Note. Fit statistics: $df = 141$; $\chi^2s = 1164.0$ ($p = .00$); root mean square error of approximation (RMSEA) = .027; 90% confidence interval (RMSEA) [.023, .030]. STEMM = science, technology, engineering, mathematics, and medicine; HS = high school.

homes in the nature of student experiences at home and in school but only minor differences in the structure of the variables within the model.

Building on this initial model, we now turn to an examination of the factors that predict the completion of postsecondary degrees and employment in a STEMM profession. The logic of the socialization argument outlined earlier in this analysis suggests that many of the major effects associated with parent education occur during the secondary school years. Some of the initial advantages associated with better educated parents then persist throughout the postsecondary (undergraduate and graduate) years and into employment at a professional level. We explore this general hypothesis by extending the previous model to incorporate additional variables that reflect postsecondary decisions and milestones. The extended model predicts employment in a STEMM profession.

The expanded model includes four additional predictor variables and a new outcome variable—employment in a STEMM profession. Three of the variables measure (a) the number of undergraduate college calculus courses, (b) the number of undergraduate college science courses, and (c) graduation with a STEMM major at the baccalaureate level. The fourth predictor variable is the completion of a graduate or professional degree in a STEMM field.

Because the definition of a STEMM profession includes the completion of a baccalaureate, only those students who enrolled in postsecondary study are included in the second model. It would be analytically meaningless to examine the influence of college calculus courses on students who did not complete high school or did not enroll in any postsecondary college or university.

Approximately 20 years after high school, 29% of students from non-college-educated homes did not enroll in any postsecondary program compared to just 9% of students for college-educated households (see Table 3).

Although the full path model is provided for interested readers, this analysis focuses primarily on the total effects of each of the variables in the two models. Both models account for more than 60% of the total covariance and display a high level of structural similarity (see Figure 2). Despite this, there are some structural differences between the two models that merit attention and discussion.

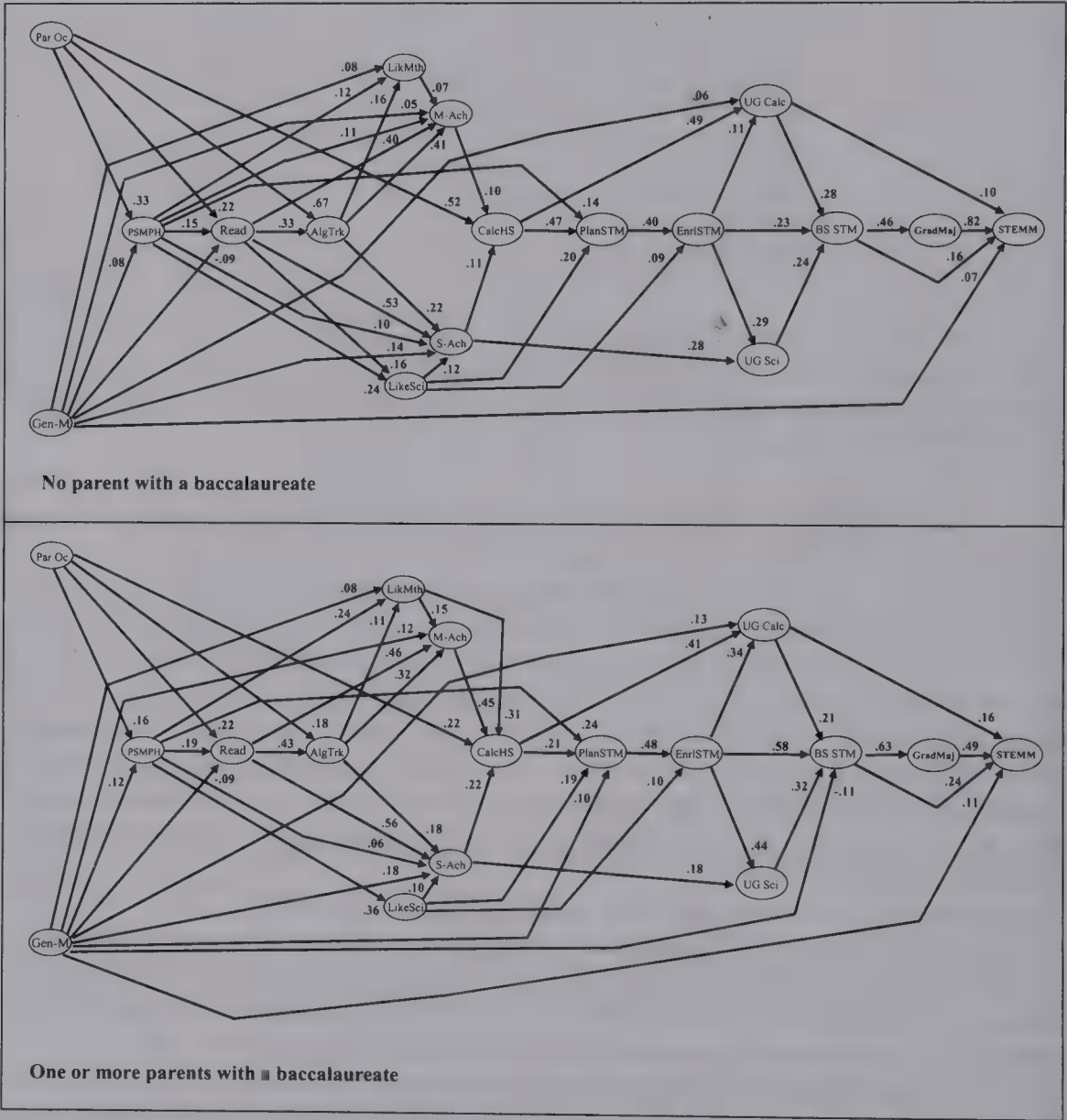


FIGURE 2 Path models to predict employment in a science, technology, engineering, mathematics, and medicine (STEMM) profession 20 years after high school.

The influence of parent encouragement of math and science during the secondary school years continued to have a significant differential effect during students' postsecondary years. The total effect of parent math-science encouragement on initial postsecondary enrollment in a STEMM program is stronger in college-educated families (0.29 compared to 0.19) and that difference persists (0.12 compared to 0.04) although the total magnitude of the effect declined over the first two decades after high school. This result suggests that other postsecondary experiences are accounting for a larger share of the covariance in STEMM professional employment but that there is a lingering effect from early socialization toward science and math.

The relative importance of planning to major in a STEMM field before college is a major predictor in the model, but the strength of the association declined and the direction of the differential changed over the 20 years after high school. Plans for a STEMM major during high school is a slightly stronger predictor of undergraduate STEMM enrollment for students from noncollege homes than college-educated homes (0.72 compared to 0.63), but high school plans for a STEMM major in college are more closely related to eventual employment in a STEMM profession among students from college-educated homes than from noncollege homes (0.24 compared to 0.08). This pattern suggests that students from college-educated homes are more likely to persist in a STEMM field once they enter it than are students from noncollege homes. As noted several times in this issue, the pathways to a STEMM profession are long and difficult, and there are numerous barriers and filters in the process that progressively reduce the flow of young adults into a STEMM profession. We read this result to indicate that the cumulative effect of parental and educational advantage influences the success rate for becoming a STEMM professional.

In the extended model, enrollment in a postsecondary STEMM program is a significantly stronger predictor of employment in a STEMM profession among young adults from college-educated homes than noncollege homes (0.49 compared to 0.19). This pattern appears to reflect the same process just discussed—that the persistence rate or success rate in STEMM programs (undergraduate, graduate, and professional) is higher for young adults from college-educated families than for young adults from noncollege families (see Table 5).

Finally, the extended model indicates that the completion of a graduate or professional degree in a STEMM field is a significantly stronger predictor of employment in a STEMM profession for young adults from noncollege homes than for students from college-educated homes (0.82 compared to 0.49). This result is partially a statistical artifact due to the small number of young adults from noncollege homes that become STEMM professionals. Because a graduate or professional degree is mandatory for employment as a STEMM professional in fields other than engineering, computer science, and a limited number of environmental/ecological specialties, there is a very high correlation between the completion of a graduate/professional degree for all young adults. This correlation is even larger among the small number of young adults from noncollege homes (about 4%) who become a STEMM professional.

These two extended models indicate that many initial parent and home-related influences on enrollment in a STEMM program persist throughout the educational process and are predictors of eventual employment as a STEMM professional. The strength of some of the initial influences diminishes during the first two decades after high school, but the basic structuring of student interest, plans, enrollments, and persistence cumulate toward the eventual goal of becoming a STEMM professional. As in our analysis of the factors predicting initial enrollment in a STEMM program, we find few major structural differences between college-educated and non-college-educated homes and families, but we see the long-term impact of early differences in parent

TABLE 5
Total Effect of Selected Variables on Employment in a STEMM Profession 20 Years After High School for Students That Enrolled in any Postsecondary Program

Variables in Model		No Parent With a Baccalaureate	One or More Parents With a Baccalaureate
Gender	Student gender (male)	.09	.14
Home and family	Parent employment in a STEMM field	.12	.08
	Parent math-science push during HS	.04	.12
	Student reading ability in HS	.05	.07
Secondary schooling	Student algebra track middle school and HS	.02	.04
	Student liked science as a subject in HS	.04	.10
	Student liked mathematics as a subject in HS	.00	.06
	Student science achievement score, Grade 12	.05	.03
	Student math achievement score, Grade 12	.02	.08
	Student completed calculus course in HS	.16	.17
	Student expectation of STEMM major Grade 12	.08	.24
Undergraduate experience	Student initial enrollment in PSE STEMM program	.19	.49
	Number of student college calculus courses	.25	.28
	Number of student college science courses	.13	.18
	Student undergraduate major in STEMM field	.54	.55
Graduate	Student graduate degree in STEMM field	.82	.49
R ²		.71	.60
N		1,781	1,074

Note. Fit statistics: $df = 179$; $\chi^2_s = 1,134.9$ ($p = .00$); root mean square error of approximation (RMSEA) = .048; 90% confidence interval (RMSEA) [.044, .051]. STEMM = science, technology, engineering, mathematics, and medicine; HS = high school.

education and understanding of the educational process in the eventual employment of these young adults in a STEMM profession.

DISCUSSION

These results reveal two key facts about the impact of parent education on the success of young adults in pursuing an appropriate education and entrance into a STEMM profession. The two-group analysis just described provides useful insights on (a) the differences in the structure of the pathways and processes associated with successful entrance into a STEMM profession and (b) the impact of cumulative advantages and disadvantages within those structures.

Our primary purpose for conducting the two-group analysis was to determine if there were major structural differences in the pathways to a STEMM profession for young adults from college-educated homes and non-college-educated homes. If, for example, some variables were very influential in college-educated homes and less important in non-college-educated homes, this result would suggest a structural difference between the two groups. Most of the literature on first-generation college students, however, shows only differences related to the level of parent education. These differences may impact a student's ability to make educational decisions and may affect a student's success rate in various kinds of college courses and work. There has not been

a rigorous examination of whether these differences reflect disparities in preparation, awareness, and incentives, or whether there are structural differences that influence these outcomes.

In broad strokes, this analysis found no major structural differences in the pathways to a STEMM profession. All of the variables that were significant contributors for students from college-educated homes were also significant contributors for students from non-college-educated homes. We noted some minor variations in the preceding discussion, but it is clear that the broad structure of the pathway to a STEMM profession is roughly the same for both groups. This result may disappoint some scholars and leaders who have examined these processes over recent decades. It may encourage others. On balance, we find this result to be mildly encouraging in that it eliminates a strong structural explanation and allows us to focus on substantive processes that favor the children of better educated families over the children of less well-educated families. We can now return to basic socialization arguments and examine the processes of cumulative advantage and cumulative disadvantage knowing that we are playing by a common set of rules.

Although the structural differences are small, the multiplicative impact of cumulative advantages and cumulative disadvantages over the first 35 years of life are substantial. Two decades after high school, only 4% of the children from non-college-educated households had entered into a STEMM profession, as compared to 13% of the children from college-educated households—a difference of more than 300%. If there are no structural differences, then we must search for the factors that account for this differential. This analysis finds that the roots of this differential are deep, beginning in the home and becoming clearly visible by the end of a student's secondary school years.

There are small differences in the proportion of college-educated parents and non-college-educated parents that strongly encourage their children to attend college and to excel in science and mathematics during high school. The children of college-educated parents report slightly more encouragement than other students. In our analysis, this reported differential in encouragement led to only modest differences in attitude toward science and mathematics—on an ordinal grade scale from A (most positive) to F (least positive), the median level of student attitude toward science and math was a B, regardless of the level of parent education. This result undoubtedly reflects the reality that student attitude toward school subjects is influenced by a combination of factors—parents, teachers, peers, and other school experiences. Parents are only one part of the equation.

Regardless of attitudes toward science and mathematics, students from college-educated homes take more science and mathematics courses in secondary school. Twenty-one percent of students from college-educated homes take algebra in eighth grade compared to only 9% of students from noncollege homes. As eighth-grade algebra is a gateway to high school calculus, we expect to see a similar difference in high school calculus courses. Of students from college-educated homes, 18% completed 1 year of high school calculus, as compared to only 6% of students from noncollege homes (see Table 2). The LSAY data used in this analysis do not tell us how college-educated parents influenced this process, but we believe that some combination of example, encouragement, and talk about career options and plans produced a significant difference in actual course enrollments in subjects critical to progressing on the pathway to a STEMM profession.

These enrollments in eighth-grade algebra and high school calculus produced higher achievement scores in science and mathematics. The children of college-educated parents score significantly higher on standardized science and mathematics achievement tests, as well as on reading tests, adopted from earlier longitudinal studies conducted by the NCES. Students from college-educated homes are twice as likely to score in the top tier of science achievement scores and math

achievement scores than are students from noncollege households (see Table 2). Students from college-educated households are also more than twice as likely to rank in the top tier of reading scores than are students from noncollege families. Each of these results reflects a combination of parental and school influences, and the differential is compounded by the tendency for children from college-educated families to attend better elementary and secondary schools than children from non-college-educated families.

The first major institutional partitioning of students occurs in terms of enrollment in post-secondary programs and institutions (Pascarella & Terenzini, 1991, 2005; Tinto, 1988). More than 90% of the children of college-educated parents enroll in some form of postsecondary education during the first two decades after high school. Only 70% of students from noncollege homes enroll in postsecondary education within those same two decades (see Table 3). Students from college-educated homes are also more than twice as likely to begin at a 4-year college or university as students from noncollege homes (67% to 31%). Students from noncollege homes are significantly more likely to start postsecondary study at a community college (40% to 24%) than students from college-educated homes (Saenz, Hurtado, Barrera, Wold, & Yeung, 2007). Although some students who initially enroll in a community college subsequently enroll in and complete a baccalaureate, most do not (Roska & Calcagno, 2010). Twenty years after the completion of high school, 69% of young adults from college-educated homes will have earned at least a baccalaureate, compared to 31% of young adults raised in a noncollege home (see Table 3). The children of college-educated parents are also 3 times as likely to have earned a graduate or professional degree (30% to 10%) as children from noncollege homes.

This cumulative advantage in educational attainment is reflected in the proportion of young adults from college-educated and non-college-educated homes that enter into STEMM professions. Building on their secondary school advantages in math coursework and achievement, young adults from college-educated homes are twice as likely to take one or more college-level calculus courses (37% to 16%) as young adults from noncollege families. They are also 3 times as likely to have taken three or more college calculus courses (13% to 4%) as young adults from noncollege families. After two decades of postsecondary, graduate, or professional study, young adults from college-educated homes are 3 times more likely (13% to 4%) than young adults from non-college-educated homes to find employment in a professional STEMM field (see Table 3).

Solid longitudinal evidence allows us to examine the cumulative pattern of changes in ways that cannot be done in cross-sectional studies. There is a substantial literature on the advantages associated with better educated parents, but most of it is cross-sectional. Cross-sectional studies often infer change over time, but the 24-year record of the LSAY allows a more complete and detailed picture of this process than is possible otherwise. We find the evidence of a cumulative education differential associated with parental education to be compelling. It is necessary to revisit this issue overtly in our current discussions of educational policy in the United States.

Researchers and educators often omit or ignore measures and analyses of parent education, likely due to the fact that this variable is frequently already fixed and beyond the control of the schools. The same could be said for race and gender, but policy leaders and decision makers have recognized the injustice of differentials based on those factors and are trying to develop remedial or compensatory programs to address these issues. It is necessary and appropriate to recognize that differentials based on parent education are equally unacceptable. Educators and policymakers must begin to construct programs that address this differential, addressing its presence from the earliest years of life throughout the long pathway to a STEMM profession.

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APPENDIX
Variables and Scales Used in Analysis of Pathways to STEMM Professions

Variable or Scale	Definition and Construction
Student gender (male)	In this model, gender was treated as a <i>dummy variable</i> and male respondents were assigned the higher value.
Parent education	This variable reflects the highest level of education attained by either parent. For single parents, the education of the single parent is used for the parent education variable. Parent education is a dichotomous variable in this analysis which is used to divide the sample into groups: (a) parents with a baccalaureate, graduate or professional degree and (b) parents with less education.
Parent employment in a STEMM occupation	This ordinal variable classifies parents as not employed in a STEMM field, employed in a STEMM support job (14%), or employed as a STEMM professional (7%).
Parent college push	This five-level ordinal variable reflects the level of parent encouragement of a student to prepare for and attend PSE. The basic questions ask parents how much education that they would like their LSAY student to complete and how disappointed they would be if the student did not complete that level of education.
Parent science-math push	This six-level ordinal variable reflects student reports about various parent activities and behaviors encouraging science or mathematics.
Home science learning resources	This seven-level ordinal variable is a count of the number of science learning resources that each student reported were available in his or her home.
Student reading score	Each LSAY student completed a reading test as a part of in-school testing. The reading test was composed of passages that were originally used in Coleman's High School and Beyond Study or the NCES National Educational Longitudinal Study of 1988. IRT methods were used to compute a reading score (0–100).
Algebra track	This is a three-level ordinal variable: (a) no algebra course in high school or algebra in Grade 10 or later, (b) algebra in Grade 9, and (c) algebra in Grade 7 or 8.
Science teacher push Mathematics teacher push	Separate five-level ordinal variables were computed for each high school science or math teacher, using student reports about the frequency of teacher encouragement to study science or math in high school and in the future.
Student attitude toward science Student attitude toward mathematics	During secondary school, each LSAY student was asked each year how much they liked the subject matter of each course in which they were enrolled, using an A-to-F grade card format. Separate five-level ordinal variables were constructed using student responses for science and math courses.
Student mathematics achievement score Student science achievement score	Using the NAEP item pool, achievement tests in math and science were developed, using IRT methods. The 1st-year achievement tests were comprehensive, but subsequent tests were tailored to three levels of achievement to obtain a more accurate measure of achievement. For this model, the achievement scores for the senior year were used. The achievement scores range from approximately zero to 100.

(Continued on next page)

Variable or Scale	Definition and Construction
Student expectation of a STEMM major in college	This variable is included in the analysis as a dichotomous variable.
Student calculus course in high school	This variable is entered into the model as a dichotomous variable.
Initial enrollment in a postsecondary STEMM program	This variable is a dichotomous variable with a value of 1 for enrollment in a community college or a senior college.
No. of undergraduate calculus courses completed	This interval variable is a count of the number of calculus (or higher math) courses completed during undergraduate study.
No. of undergraduate science and engineering courses	This interval variable is a count of the number of science, engineering, and technology courses completed during the undergraduate years.
An undergraduate degree in a STEMM field	This dichotomous variable indicates whether each individual earned a baccalaureate degree in a STEMM field.
A graduate or professional degree in a STEMM field	This dichotomous variable indicates whether each student earned a graduate or professional degree in a STEMM field.
Employment in a STEMM profession	This dichotomous variable is a measure of employment in a STEMM profession 13 to 17 years after high school graduation.

Note. STEMM = science, technology, engineering, mathematics, and medicine; PSE = postsecondary education; LSAY = Longitudinal Study of American Youth; NCES = National Center for Educational Statistics; IRT = item response theory; NAEP = National Assessment of Educational Progress.

At the Precipice: The Story of Mathematics Education in the United States

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According to a variety of metrics (NAEP, PISA, TIMSS, college completion, etc.), the mathematics knowledge of U.S. students can be described, at best, as mediocre. In light of the growing importance of mathematics for both individual and national economic competitiveness, this weak performance has rightfully alarmed policymakers and the public. The results of decades of research on improving mathematics curricula, most notably the TIMSS, TEDS, and PROM/SE studies, points convincingly to the possibilities of more rigorous, more focused, and most of all, more coherent mathematics standards. The data clearly demonstrate that, compared with higher performing countries, the United States intended curriculum is highly fragmented and the implemented curriculum exceptionally variable across and even within local education agencies. Although the recently adopted Common Core Standards in Mathematics present a major opportunity for overcoming these defects, the weak preparation of U.S. mathematics teachers, particularly primary and early secondary teachers, poses a significant obstacle. The author concludes by calling for a major effort to strengthen the recruitment and preparation of future mathematics teachers and for more aggressively engaging the public in the task of implementing strong mathematics standards.

By now it should be beyond dispute that the mathematics skills of American students leave a great deal to be desired. The performance of U.S. students on mathematics assessments ranges from simply mediocre to extremely poor, depending on the type of test and grade level. The U.S.-focused National Assessment of Educational Progress (NAEP), the internationally-oriented Trends in International Mathematics and Science Study (TIMSS), and the Program for International Student Assessment (PISA) all demonstrate that most students educated in American schools lack the ability to understand and apply mathematics principles. The studies reveal large achievement gaps among socioeconomic and ethnic subgroups and indicate that long-term trends show only modest improvement at best.

THE DISTURBING REALITY

A realistic appraisal of NAEP data gives grounds for alarm, despite incremental gains in student performance. Since 1996, NAEP scale scores have increased by a statistically significant 16

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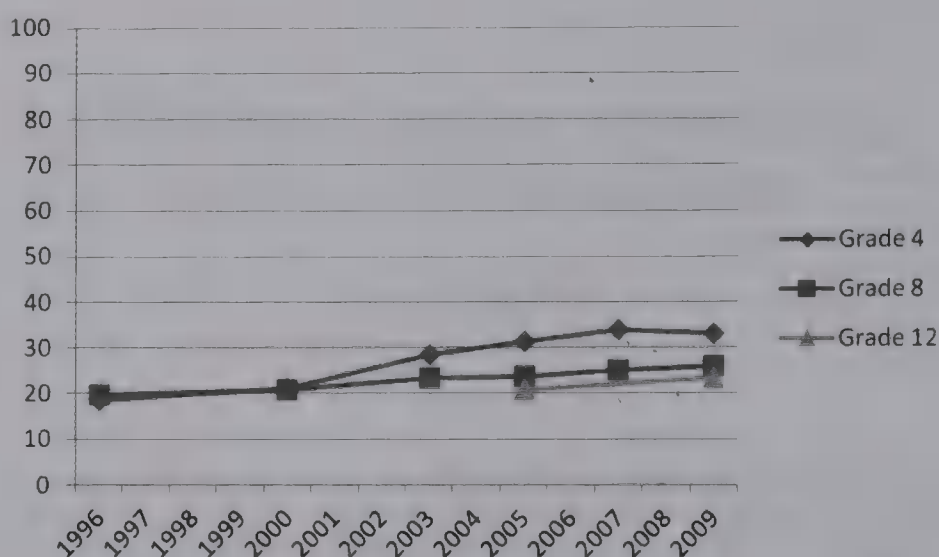


FIGURE 1 Trends in percentage proficient in mathematics on the National Assessment of Educational Progress, 1996–2009. TEDS-M Countries' Overall Performance with Respect to Mathematics Content Knowledge at the Primary Level. (From Center for Research in Mathematics and Science Education 2010) TEDS-M Countries' Overall Performance with Respect to Pedagogical Content Knowledge at the Primary Level. (From Center for Research in Mathematics and Science Education 2010). (color figure available online).

points in fourth grade (from 224 to 240) and 12 points in eighth grade (271 to 283). Similarly, the percentage of students scoring proficient in mathematics has increased from 19 to 33% in Grade 4 and from 20 to 26% in Grade 8. The progress of 12th graders, who are tested less frequently, is much less impressive—scale scores have increased from 150 to 153 since 2005 and the percentage proficient has risen from 21 to 23% over the same time period (see Figure 1).

In spite of the 14-point increase in the percentage of fourth graders that are deemed proficient, it should be emphasized that about three fourths of U.S. eighth graders enter high school *not* proficient and therefore *not* prepared to move to a higher level of mathematics. Therefore, it is not surprising that roughly *three fourths* of American high school students graduate with a relatively poor grasp of mathematics. Even the brightest students do not fare well, with only a tiny percentage of students reaching the advanced level on the NAEP: 6% in Grade 4, 8% in Grade 8, and a vanishingly small 3% in Grade 12. These trends are made all the more discouraging by the fact that gains have largely stalled in the last several years. Between 2007 and 2009, scale scores were unchanged in fourth-grade mathematics, whereas the percentage proficient actually declined. The gains in Grade 8 were marginal at best.

The vast majority of students' failure to achieve mathematics proficiency is more than a matter of not living up to some arbitrary standard of academic excellence. In an increasingly interdependent international economy, American students are competing both with their peers within the United States and millions more in other countries, making comparisons with students in other countries essential. International assessments of academic achievement provide a useful benchmark for these comparisons.

Of the two major international assessments, the TIMSS more closely resembles the NAEP, with assessments in Grades 4 and 8 over a similar span of time (1995–2007) and with comparable content and design (National Center for Education Statistics, 2007). On the most recent

assessments, U.S. students performed above the international mean of 500 in both fourth grade (529) and eighth grade (508). The United States ranked above 23 of 36 nations in Grade 4 and above 37 of 48 nations in Grade 8, but it trailed the highest performing nations such as Singapore, Taiwan, Korea, Hong Kong, and Japan by significant margins. Although these results are the most favorable of all assessments, they come with important caveats. First, many nations that outperformed the United States on the 1995 study did not participate in the 2007 TIMSS, which could artificially inflate the relative position of the United States. Countries such as Canada, France, Switzerland, and Belgium did not participate in 2007; South Korea participated only at eighth grade; and the Netherlands, New Zealand, Austria, Denmark, and Germany participated only at fourth grade. Second, as with the NAEP results, the TIMSS shows only moderate gains since 1995, increasing by 11 points in fourth grade and 16 points in eighth grade.¹

Between 1995 and 2007 the relative position of the United States remained effectively unchanged. Of the 16 countries that participated in both the 1995 and 2007 tests, the United States ranked ninth in 1995 and seventh in 2003—an improvement that was almost entirely due to declines among countries such as the Czech Republic and Austria. Third, the relative performance of the United States decreases as students advance through grade levels. U.S. performance is well above the international average in fourth grade; slightly above in Grade 8; and, according to the 1995 study of U.S. 12th graders, ranks near the bottom of all countries in mathematics literacy. The decrease in mathematics success is inversely related to the increase in mathematics difficulty.

As with the NAEP, even the best U.S. students do not perform particularly well. The percentage of students at the advanced level on the TIMSS is well below that of leading countries. In 2007, only 10% of U.S. fourth graders achieved the advanced benchmark, compared with 23% of Japanese students. In eighth grade, 40% of Korean students reached the advanced level as opposed to 6% of U.S. students. At the 95th percentile, U.S. students performed at around the same level as the *median* student from Taiwan or Singapore in 2003. Even advanced 12th graders grossly underperformed their peers in other countries, ranking near the bottom of countries in 1995. Those who had taken calculus outperformed only two of the 15 participating countries. The highest performing U.S. students have also demonstrated little improvement in the last several years, with no significant increase since 1995 in Grade 4 and flat scores in Grade 8 since 1999.

PISA has a different emphasis than TIMSS or NAEP, assessing mathematics literacy (i.e., the application of mathematics to real-world situations) rather than content knowledge. It also tests a different selection of countries than TIMSS. The results of both tests are roughly comparable, however, and previous research has demonstrated a strong relationship between PISA and TIMSS outcomes (Ginsburg, Cooke, Leinwand, Noell, & Pollock, 2005; Wu, 2009). Recent iterations of TIMSS (2007) and PISA (2006) indicate a strong correlation of .93 in the scale scores of countries that participated in both assessments (Gonzales et al., 2009; Olson, Martin, & Mullins, 2008; Organisation for Economic Co-operation and Development [OECD], 2007).

If the performance of the United States on the TIMSS is discouraging, the results from PISA are little short of disastrous. In the 2003 mathematics-focused iteration of PISA, the U.S. 15-year-olds ranked 24th in mathematics literacy among nations that belonged to the OECD with a mean score of 472, compared with an OECD average of 486 and an EU19 average of 496. The top-ranking U.S. students fared no better, with the 90th and 95th percentile students also performing

¹It should be noted that TIMSS scores are scaled according to the 1995 benchmark study (a score of 500 in 1995 is the equivalent to a 500 in 2007).

well below other OECD countries. The low ranking of U.S. students continued in the recently released 2009 PISA results. Although the average U.S. performance in mathematics improved from 474 to 487, the United States still ranked 25th among 34 OECD countries.² Among students at the 95th percentile, U.S. students ranked 22nd.

U.S. students also struggle on other indicators of academic achievement. A high proportion of freshman college students require remedial mathematics courses (22% in all schools, 42% in community colleges; Parsad, Lewis, & Greene, 2003) and, according to data collected by the OECD in 2010, U.S. students are less likely to graduate from high school than other industrialized nations. In just the last decade the United States entirely lost its leadership in the percentage of students graduating from college: in 2010 U.S. students were less likely to finish a college degree and posted the highest college dropout rate of any OECD nation. Finally, a much smaller share of U.S. university students major in life sciences, mathematics, or engineering than their peers in other wealthy countries.

The United States' weak mathematics performance on these international tests is in part related to the achievement gap in American education. By any metric, low-income, Black, and Hispanic students do less well in mathematics than White and higher income students. According to the 2009 NAEP, 44% of White students achieved proficiency in fourth-grade mathematics as compared with only 15% of Black students. In eighth grade, 33% of Whites and only 11% of Blacks scored proficient, whereas in 12th grade 30% of Whites and just 6% of Blacks performed at or above proficiency. The numbers are very similar for free and reduced meal eligible students and Hispanics. On the TIMSS, Black U.S. students would rank 25th in Grade 4 and 27th in Grade 8, whereas on PISA Black students' average score of 409 would place them in the lowest category of achievement. The gaps have remained stubbornly persistent, with little change in these figures since 2003. Even more startling, the achievement gap is replicated among higher performing students, with tiny percentages of low-income and minority students reaching the highest levels of proficiency (Plucker, Burroughs, & Song, 2010).

The totality of the preceding data demonstrates that when compared to students in other countries, U.S. students' mathematics skills decrease as they develop, falling from rough parity in the early grades to badly behind their peers by graduation. Of those students that attend college, a disproportionate number require remediation in mathematics and typically avoid mathematics-related courses and majors. Whether they complete college or not, many U.S. students lack the basic quantitative skills required to compete in the international economy. The reality is that the U.S. educational system is fundamentally failing its responsibility to prepare today's students for the future. Nearly 30 years after the publication of *A Nation at Risk*, and after a decade of accountability reforms, American students' performance in mathematics remains mediocre.

THE CONSEQUENCES

The United States based its position as a global economic leader in the 20th century not only on the protection of individual liberties and natural resources but also on the aggressive promotion of mass education. The United States established a standard of universal secondary education

²The 2009 gains on the PISA were largely a recovery from a sharp decline on the 2006 PISA. The 2009 score was roughly equal to the 2003 PISA scores (483; Fleischman, Hopstock, Pelczar, & Shelley, 2010; OECD, 2004).

that gave it a huge advantage in human capital in the last century (Goldin, 2001). Aside from strictly economic gains, effective educational systems can produce a range of other benefits, such as lower crime rates, better public health, political stability (McMahon, 2004), benefits that are often intergenerational (Wolfe & Haveman, 2001).

The long tradition of public support for education in the United States is closely linked to the nation's commitment to equality of opportunity: Education has often been viewed as the great equalizer that makes the American Dream possible. A strong system of public education has been assigned the role of a guarantor of the nation's democratic ideals; that diligence and merit should play a greater role in human flourishing than the accidents of birth.

The consequences of the inadequacy of U.S. mathematics education are stark. First, there is considerable evidence for a relationship between educational performance and economic growth. Research suggests that educational quality (defined as cognitive knowledge rather than years of schooling)—and in particular mathematics and science content knowledge and skills—is an important determinant of per capita GDP growth (Hanushek & Kim, 1995). This impact was found to be significant at all levels of the educational distribution; in other words, the economy is influenced not just by the mathematics skills of high flyers but by average and lower performing students as well (Hanushek & Woessmann, 2007). Freeman (2006) argued that U.S. technological competitiveness is undermined by its shrinking share of the world's science and engineering graduates.

The increasing role of technology coupled with the spread of globalization also has an important effect on the prospects of individuals. For example, part of the growth in wage inequality over the last several decades may be due to skills-based technological change (Juhn, Murphy, & Pierce, 1993; Krueger, 1993; Levy & Murnane, 1992; but see Lowell & Salzman, 2007). As computers have proliferated society, the "skill premium" for mathematical and other related skills has increased, strengthening the relationship between education and earnings. Quantitative literacy has an especially large impact on future earnings as well as securing long-term employment (Murnane, Willett, & Levy, 1995; Rivera-Batiz, 1992). Mathematical literacy has become central not just to employment but to making health and medical decisions (Reyna & Brainerd, 2007) and to interpreting the huge volume of statistical information that is now part of everyday life (Gal, 2002). Mathematical concepts play a key role in personal areas like retirement planning (Braunstein & Welch, 2002) but are also foundational to democratic citizenship, given the centrality of budget and taxation questions to political debate.

All of this paints a worrisome picture—that of a typical American high school graduate with little quantitative ability. Many high school graduates find themselves unable to enter college and take credit-bearing mathematics courses, or to take on jobs that demand technical skills involving mathematics and quantitative analytical thought. These are individuals who will find it difficult to compete for jobs in a highly technological economy that operates in a global context. This places the United States at a precipice with a choice as to which way it will go, but the fall may be steep if the country moves the wrong way.

In the rest of this article I discuss the types of policies that I believe are needed to guide mathematics education reform as we move forward and, we hope, away from the precipice. I discuss the related research findings as to how these elements of the system have contributed to the problem detailed in the previous section. My aim, however, is not to assign blame but to identify potential solutions that will help American schools live up to their promise. In the following sections I address three elements that I believe should constitute the essential part of

the U.S. educational reform agenda in mathematics education: first, curriculum, including both intended coverage as defined by standards and the mathematics content actually delivered to students by the teachers; second, teacher knowledge of mathematics content and pedagogical content knowledge by which content is delivered; and third, public expectations of and support for demanding content standards and course requirements.

CURRICULUM

Standards

One way that most of the developed nations ensure the quality of mathematics instruction is by providing uniform national standards that define in detail the mathematics content that is to be covered by teachers at each grade level. Such standards are designated as content standards, so as to distinguish them from performance standards, which are typically used in accountability systems. The latter often refer to cut points on assessments that are measures of the actual content standards themselves.

Formal content standards provide direction to teachers by defining the content that instructors should teach at each grade level, in what sequence, and to what depth. National content standards in mathematics serve as a national map of content coverage that helps to structure mathematics instruction. As a result, curriculum materials (e.g., textbooks, tests), teacher training, and professional development are all developed with respect to those standards. In this way the standards serve as the focal point of the educational system. Research results from the curriculum analyses of the content standards for the almost 50 countries that participated in the 1995 TIMSS indicated that substantial variation in content standards existed among countries (Schmidt, McKnight, Valverde, Houang, & Wiley, 1997; Schmidt, Raizen, Britton, Bianchi, & Wolfe, 1997).

Most industrialized nations possess content standards that are national in scope (Schmidt, Cogan, Houang, & McKnight, 2009). A few nations follow the U.S. pattern of using regional content standards, with subgovernments possessing a fair degree of latitude in setting standards. Although it is certainly possible *in theory* for regional standards to match (or even exceed) the quality of national standards, the standards of American states generally fail to do so. Based on a comparison of the standards used by the TIMSS highest performing nations (which we term the A+ countries) at eighth grade with those of 21 U.S. states, Schmidt, Wang, and McKnight (2005) found that state standards were substantially different in three important dimensions: focus, coherence, and rigor.

Curricular focus has to do with the number of content topics included at a given grade level. Coverage of a larger number of topics generally requires that there is less instructional time for any one topic, and hence less focus. At the time of the study and even more recently, U.S. standards tended to have much less focus, with more topics covered in each grade. This stands in contrast to most A+ countries.

Rigor is defined by the content's level of complexity at each grade level. It is essentially a measure of how demanding the mathematics content is. In A+ countries, students at the eighth grade are expected to study algebra and geometry. In the United States, the vast majority of eighth graders (variously estimated to be 70 to 80%) study much more elementary topics like fractions, percentages, ratios and proportionality. The low level of rigor in U.S. standards has begun to

improve in the last 5 to 10 years, however, with many states now requiring algebra. This trend is likely to be consolidated with the development of the Common Core State Standards, which are discussed further next.

The third characteristic distinguishing U.S. state mathematics standards from those of the highest achieving nations is curricular coherence. We defined content standards:

to be coherent if they are articulated over time as a sequence of topics and performances consistent with the logical and, if appropriate, hierarchical nature of the disciplinary content from which the subject-matter derives. . . . This implies that, for a set of content standards “to be coherent,” they must evolve from particulars (e.g., simple mathematics facts and routine computational procedures associated with whole numbers and fractions) to deeper structures. (Schmidt et al., 2005, p. 528)

This characteristic is the most important of the three.

Ideological influences, political opinions, and teacher preferences, as well as textbook content, have long influenced U.S. state standards. Driven by the principle of inclusion, grade-level content standards ballooned to include a wide variety of topics. This resulted in what could be called an arbitrary collection of topics, and not a sequenced set of topics reflecting the logical and hierarchical structure of mathematics. Unlike in the United States, A+ countries develop standards in a much more academic and substantive way.

The lack of focused, coherent, and rigorous content standards has real consequences. A cross-national comparative set of analyses by Schmidt and Houang (2007) examined the relationship of coherence and focus to achievement. Using 1995 TIMSS data, the researchers found that curricular coherence and focus had a statistically significant relationship with student outcomes. The greater the alignment of a country’s standards with the A+ model of coherence, the greater the predicted achievement in seventh and eighth grade ($p < .02$). The relationship was weaker in earlier grades; marginally so at fourth grade ($p < .08$) but not statistically significant at third grade. Similarly, greater curricular focus was also related to achievement, with statistical significance in third, fourth, seventh, and eighth grades. The explanatory power of focus and coherence was fairly robust, accounting for between 22 and 26% of the variance in student achievement across countries. Effect sizes ranged from one fourth to three fourths of a standard deviation at eighth grade, with the predicted effects generally greater at the earlier grades. Aside from the dimensions of rigor, coherence, and focus, cross-national analyses of eighth-grade content topics indicated a strong relationship between intended curriculum and student achievement in those same topics (Schmidt et al., 2001).

Implemented Content Coverage

Content standards wouldn’t mean a great deal if they had no relationship to what was actually taught in the classroom, but the cross-country analyses cited in the previous section also provide evidence suggesting that content standards are generally implemented by schools and teachers. As measured by either teacher coverage of a specific topic or by the amount of instructional time allocated to that topic, cross-country analyses have shown that the content countries emphasized in their standards is the content to which students find themselves exposed (Schmidt et al., 2001).

This process of implementing standards, however, is not perfectly clear-cut. U.S. teachers remain a critical mediator in the transmission of content, and as such, content standards also work

indirectly through a teacher's ability to cover the content. The relationship of content coverage to both achievement and achievement gains was discernable both across countries and across classrooms within the United States (Schmidt et al., 2001).

All of the aforementioned evidence suggests that the more curriculum content coverage of a topic area, the larger the achievement gains in that topic area, whether content coverage is measured as emphasis in content standards, teacher coverage of a topic, or the amount of time allocated to the coverage of the topic. The curricular priority of a country is thus related to the profile of achievement gains across topics for that country. When coupled with the results of other researchers (Gamoran, Porter, Smithson, & White, 1997; Rowan, Correnti, & Miller, 2002), these studies make a strong case for the link between achievement and Opportunity to Learn.³ In fact, this relationship is now viewed by many as an established fact (Floden, 2002; Schmidt & Maier, 2009; Suter, 2000).

Content Coverage in the United States

Content standards therefore play a multifaceted role in the learning process, both by shaping the content of the curriculum directly and by influencing the structure of that curriculum and the behavior of teachers indirectly. As such, weak state standards could bear some responsibility for the mediocrity of mathematics learning in the United States. A comparison of state and international standards by Schmidt, McKnight, Cogan, Jakwerth, and Houang (1999) demonstrated that state standards generally lacked the focus, rigor, and coherence of high-achieving countries. According to the study, teacher content coverage in the United States, especially in the eighth grade, also fell far below that of the best performing nations. Analyses both of the standards and what was actually taught indicated that eighth-grade content coverage in the United States fell behind most of Europe and Asia. The typical eighth grader in the United States was 1 to 2 years behind her peers in the OECD. Although lower secondary (middle school) students in most nations were exposed to algebra and geometry, roughly three fifths of U.S. students⁴ were focused on simple arithmetic topics like fractions, decimals, percentages, ratios, and proportions—topics that students in other nations had already moved well beyond.

Has anything changed in the last 10 years? Perhaps. The reforms of the last decade have probably expanded the proportion of middle school students who study algebra. However, there is reason to worry that there are still vast inequalities in the rigor of content coverage. One way this occurs is through the practice of content tracking, which assigns students to different groups covering different content. Because of such a phenomenon, many schools place individuals on learning paths where they are guaranteed to learn less than other students, with little opportunity to close the gap. Despite long-standing criticism, tracking still remains a fairly common practice in the United States. In other countries it remains relatively rare in Grades 1 through 8.

In TIMSS, only one fourth of U.S. students attended a school without some form of tracking at eighth grade. Although somewhat dated, there is scant evidence to suggest this tendency has changed (Schmidt, 2009). The proportion of the total variation across U.S. classrooms in tracked

³For a definition and history of Opportunity to Learn, see Schmidt and Maier (2009).

⁴The exact percentage is difficult to calculate because of varying definitions of what constitutes Algebra I. In some cases, courses are listed as algebra but in fact spend much of their time on arithmetic.

schools at eighth grade in the rigor of the content coverage related to tracking is estimated as 40% (Schmidt, 2009). Schools without tracking have approximately half the variation in content coverage as schools that have tracking. Although tracking does provide some benefit to students who are placed in the most rigorous courses, with higher eighth-grade mathematics scores than those at nontracked schools, students placed in regular mathematics courses at nontracked schools outperform those at tracked schools. As a result of this variation in content coverage, some students in the United States receive exposure to content comparable to that of eighth graders in other countries, whereas others do not. This reduces the overall U.S. performance on international mathematics tests, because many other students are taking the international equivalent of a sixth- or seventh-grade mathematics course.

A second source of inequality emerges when we examine nontracking variation in content coverage within states, even within districts, and schools. Data from *Promoting Rigorous Outcomes in Mathematics and Science Education (PROM/SE)* shows students receive vastly different content coverage than their schoolmates at the same grade level, even within the same school, both in terms of the amount of time allocated to content coverage and the sequence of such coverage (see Schmidt & McKnight, in press). The resulting inequalities are not always randomly distributed. A student's opportunity to learn mathematics is greatly influenced by where he lives, his race, his family's income, and the particular teachers he happens to have.

Such inequalities in content coverage affect the entire system, not just minority or low-income students, making a mockery of the idea of equal opportunity for all. Two students of similar backgrounds in the same district and school are not ensured equal content coverage. No matter what other policies are put into place, it is implausible to think that students will receive an adequate education in mathematics if they do not have the chance to learn the same important mathematics. Further, these inequalities tend to compound over time. Rather than feature a system in which struggling students receive concentrated attention so that they have a chance to catch up, the United States effectively locks its struggling students into a lower tier, a strata with lesser educational and hence fewer lifetime opportunities. These are differentiations that sometimes may have nothing to do with a student's native ability or work ethic. They are in effect a kind of educational caste system.

Policy Implications Related to Curriculum

There are a number of substantive steps that policymakers can take to improve student learning. To date much of the debate about how to improve schools has focused on strictly structural questions like charter schools and pay for performance that do not have a direct impact on what students learn (although they may have an indirect effect). Setting aside the utility of these proposals, addressing content standards and content coverage provides a very straightforward form of intervention, one that holds considerable promise. Changing the substantive content that schools convey to their students by improving the rigor, focus, and coherence of intended coverage (standards) and implemented coverage could have a significant impact on mathematics achievement.

The beginnings of this process are already under way. More than 40 states and the District of Columbia have adopted a new set of mathematics standards called the Common Core State Standards. Representing a fairly dramatic break with past practices, the Common Core State

Standards move the United States much closer to a system of national standards. If properly implemented, the Common Core State Standards could substantially reduce cross-state variation in intended content coverage, thereby exposing all students in participating states to internationally benchmarked standards. Because the Common Core State Standards embody standards for all students (even in middle grades), their implementation has the potential to affect the entire distribution of students, including those currently tracked into less demanding mathematics classes, thereby improving overall mathematics achievement on international assessments.

At present there are a few states that do fairly well on international tests,⁵ but the vast majority of states and districts register fairly weak mathematics achievement scores compared with other OECD nations (Phillips, 2010). To the extent that these states have weak content standards and/or implemented content coverage, strengthening those standards and coverage could improve the overall performance of the United States on these assessments. By examining the curriculum of two states that participated in the 2007 TIMSS as test “countries” and hence can be directly compared to other countries, we can examine the potential of the Common Core State Standards. These two states—Massachusetts and Minnesota—did fairly well on the most recent TIMSS, outperforming the U.S. average and posting very competitive scores internationally (Olson et al., 2008; SciMathMN, 2008). These two states have also placed near the top on NAEP, Massachusetts ranking number 1 in both fourth and eighth grade and Minnesota ranking third and second, respectively. In addition, both states received moderately favorable ratings for their mathematics standards (Carmichael, Martino, Porter-Magee, & Wilson, 2010).

The case of Minnesota is particularly informative. The state participated in the TIMSS in both 1995 and 2007, but in contrast to its excellent 2007 results it ranked near the U.S. average in 1995, placing the state in the lower middle of the distribution of participants. At that time, Minnesota did not have state standards in place but was in the process of adopting them. Specifically, TIMSS 1995 teacher data, which reported on classroom coverage, demonstrated a lack of focus and coherence. In 1995 Minnesota teachers in the fourth and eighth grade were covering topics at grade levels that were not covered in A+ countries, that is, Minnesota was an example of the “laundry list” approach to curriculum (Schmidt, McKnight, & Raizen, 1996).

By 2007 Minnesota had thoroughly revamped its content standards, reducing its coverage of topics that were inconsistent with the international model of coherence from about half to less than five percent (SciMathMN, 2009). Although there is no conclusive causal evidence that Minnesota’s gains between 1995 and 2007 were primarily due to changes in its standards, the data do support the hypothesis that there is a relationship between standards and achievement—that content coverage led by coherent, focused, and rigorous standards properly implemented by teachers can improve student outcomes in mathematics. Most important, this improvement can happen in an American state. As a species of national standards, the Common Core State Standards have the potential to apply the lessons of Minnesota’s accomplishment nationwide. But if the Fordham Institute’s recent analysis of state standards is correct, most states still have quite a long way to go if they are to meet the requirements of the Common Core State Standards (Carmichael et al., 2010).

Improving overall student performance by means of a strengthened curriculum is a critical task, but equally critical is ensuring greater equality in learning opportunities. In light of the evidence,

⁵Although even in the highest achieving states there remains room for improvement (see Hanushek, Peterson, & Woessmann, 2010).

I think that content coverage as guided and defined by the Common Core State Standards is not only an *essential precondition* for aggregate academic success in mathematics but also an essential component of the nation's overall success. To truly make gains in mathematics, the nation requires strong, effective, and realized standards for all—not just the elite.

To date, curricula in the United States have been the product of ad hoc efforts by a loose collection of entities: textbook publishers, test developers, local districts, states, national organizations, and those who develop and provide professional development. Thus far no single entity has had the ability to foster a single vision of what content standards should look like, and the result is best described as a “splintered vision” defining the mathematics curriculum (Schmidt et al., 1996).

The advent of the Common Core State Standards is a welcome opportunity for addressing this problem. Focused, rigorous, and coherent content coverage for all students can be ensured only in a country as large and diverse as the United States with some type of national system of standards. The Common Core State Standards provide an opportunity to force the various elements to work together following Simon's (1975) “rational actor model” in which all stakeholders make “individual decisions with an eye to the cumulative effect of those decisions on the whole” (Schmidt, McKnight, & Raizen, 1997, p. 92). The Common Core State Standards therefore can provide coherent, focused, and rigorous mathematics standards that help all the various educational actors cooperate with one another so that textbooks, tests, and professional development work toward a common vision: the Common Core State Standards.

The possibilities presented by the Common Core State Standards, however, are only that—possibilities. There is no guarantee that the core will be implemented effectively. One of the greatest obstacles to the Common Core State Standard's success is the very tradition it is meant to supersede, namely, the deeply entrenched view that education *should be* highly fragmented and localized. In that sense the success of the Common Core State Standards will have as much to do with political management as with well-written standards.

TEACHERS

Students cannot simply absorb content knowledge by sitting in its presence. Instead, teachers must present content, using their mathematics and pedagogical knowledge to convey that content to their students in such a way that it creates meaningful learning experiences. Teachers represent a second major factor affecting student performance: the ability of a teacher to create instructional experiences in which student learning takes place. This ability has been described as either teacher quality or (in recent literature) teacher effectiveness.

Teacher quality has become a major focus of attention, both by researchers and policymakers. Recent work has argued that teacher quality is a powerful determinant of student outcomes, especially in mathematics. It has also been labeled a significant limiting factor for U.S. schools (Clotfelter, Ladd, & Vigdor, 2007; Rivkin, Hanushek, & Kain, 2005; Wayne & Youngs, 2003). These concerns have sparked federal efforts such as No Child Left Behind (NCLB), and local efforts in districts like Baltimore, Denver, and Washington, DC, to improve teacher quality. Federal legislation now requires that all states define “qualified” teachers and to have such teachers constitute a large percentage of the teaching force. A glaring problem with this approach is that, as with content standards, there is both tremendous variation among states in what a “qualified”

teacher is. The type and level of mathematics knowledge a teacher should possess has been an especially vibrant area of debate (Begle, 1979; Begle & Geeslin, 1972; Darling-Hammond, 1999; Darling-Hammond & Youngs, 2002; Good & Grouws, 1987; Zumwalt & Craig, 2005).

In this article I have chosen not to address the more general and difficult concept of teacher “effectiveness.” This broader notion is a much more complex issue, as it is often coupled with notions of student achievement or achievement gains, which involve complex statistical and psychometric issues about which there is much disagreement (National Research Council, 2010). Instead, I have limited my focus to the concept of a teacher’s professional competence, focusing specifically on the professional content knowledge necessary for teachers to successfully solve core, job-related problems (i.e., the teaching of mathematics).

Mathematics Content Knowledge

In this article I focus on a specific area of teacher competence, namely, professional knowledge. Professional knowledge for mathematics teachers includes both mathematics content knowledge and pedagogical knowledge. Pedagogical knowledge refers to the general issues of classroom and instructional organization (including such issues as motivation, classroom management, and lesson planning) as well as issues of mathematics instruction, such as the psychology of learning mathematics, methods of teaching algebra, and more practical issues like probing student understanding of mathematics. These areas constitute the professional knowledge necessary to have in order to undertake the typical activities of instruction and assessment. In what follows, I focus on mathematics content knowledge.

Directly testing teachers’ level of mathematics content knowledge is quite difficult due to political sensitivities. One method is to ask teachers how well prepared they feel to teach specific mathematics topics. For example, a 2006 study based on the PROM/SE project surveyed more than 5000 teachers from 60 school districts about 24 mathematics topics, asking, “How well prepared academically do you feel you are—that is you feel you have the necessary disciplinary coursework and understanding—to teach each of the following at the grade level you are currently teaching” (PROM/SE, 2006).

The list of topics varied based on the grade level of the teacher in question. Teachers were grouped into three broad categories: elementary (1–5), middle (6–8), and high school (9–12). The results of the survey are summarized next.

The majority of *elementary teachers* reported that they felt very well prepared to teach most of the topics that were a part of their elementary school curriculum. This result provides little comfort, however, because in Grades 1 to 5 there were only two topics (whole number meaning/place value and operations and their properties) in which more than 75% expressed confidence in their preparation to teach. For teachers only at Grades 4 and 5, there was one additional topic—common fractions—that met the 75% threshold.

Equally alarming, elementary school teachers demonstrated a lack of confidence in topics that would be covered in later grades. This is a disturbing result, given the relationship of basic mathematics to more advanced topics. Teachers should have sufficient grounding in more advanced mathematics because it serves as the necessary background for what they are presently teaching, but the survey results suggested that for many teachers this is simply not the case.

The elementary school teachers surveyed by PROM/SE clearly recognized the limits of their knowledge. Although the survey used self-evaluations in which teachers stated their own sense of competence, in all likelihood the results were if anything *inflated*; it is quite probable that many teachers had an exaggerated degree of confidence in their preparation and competence. Even if taken at face value, the results show that elementary teachers do not express strong confidence in their ability to teach the topics that are included in the Common Core State Standards and that are fundamental to enhanced student achievement in mathematics.

Middle school teachers (Grades 6–8) had similar results. Faced with a list of more advanced mathematics topics, the number of topics for which at least three fourth of teachers claimed to feel very well prepared to teach was *zero*. Algebra plays an important part in the Common Core State Standards for middle grades, yet only half of PROM/SE middle school teachers stated that they were very well prepared to teach linear equations and inequalities. An even smaller proportion felt well prepared to teach algebraic related concepts like proportionality (41%), slope (38%), and functions (39%).

We should expect that all middle school teachers will feel capable of teaching the full range of K–8 topics, and probably many high school topics as well. This quite modest goal is regrettably far out of reach, which raises serious questions about the ability of states to live up to the Common Core State Standards to which they have subscribed. Again, as with elementary school students, the similarity between the socioeconomic and ethnic profile of the PROM/SE students and those students from other states suggests that the problem is likely national in scope.

The results for *high school teachers* were strikingly different. For those teaching Grades 9 to 12, three fourths of respondents in the survey demonstrated a confidence to teach almost three fifths of the listed mathematics topics; however, there were weak points. Teachers reported low levels of preparedness in three-dimensional geometry, geometric transformations, logarithmic and trigonometric functions, and calculus. Common Core State Standards call for the inclusion of probability and statistics at the high school level. With less than half of high school mathematics teachers feeling well prepared to teach these topics, we can expect that many school districts will struggle to adequately prepare students in these areas.

Elementary School Teacher Preparation

The results of the PROM/SE survey of teacher confidence are instructive. Elementary and middle school teachers appear quite similar, with both sets of teachers demonstrating lower levels of confidence to teach specific mathematics topics than high school teachers. One possible explanation is the very different training received by K–8 as opposed to high school teachers. There is considerable variation in the proportion of elementary school teachers that have majors or minors in mathematics, ranging from almost none in the first grade to 65% in Grade 8. By contrast nearly all high school teachers in the study had a major or minor in mathematics and were much more likely to feel very well prepared to teach the topics in their curriculum. This suggests that the lack of content knowledge reported by elementary and middle school teachers might be primarily the result of inadequate preparation.

Indeed, by international standards, U.S. elementary school teachers receive far less training in mathematics content than their international companions. A 2010 study of teacher preparation (Teacher Education and Development Study in Mathematics [TEDS-M]) conducted in 16

countries evaluated the amount of mathematics training primary and lower secondary school teachers received (Center for Research in Mathematics and Science Education, 2010; Schmidt, Cogan, & Houang, 2011). In the United States, 81 public and private universities and colleges were randomly selected to participate in an examination of teachers about to enter the teaching workforce. Nearly 3,300 potential future teachers participated in the U.S.-based study, and 23,000 future teachers around the world did so. Participants in the study were tested on their mathematics content knowledge and pedagogical content knowledge. Mathematics knowledge questions covered topics typically found in Grades 1 to 8 but focused on the advanced mathematics supporting those topics.

Like the 1995 TIMSS results related to fourth-grade performance, future elementary teachers in the United States ranked somewhere in the middle of the international distribution of overall mathematics knowledge, with a performance that was comparable to that of Germany, Russia, and Norway but well behind the high-achieving countries of Taiwan, Singapore, and Switzerland (see Figure 2). The performance of future U.S. teachers could best be described as mediocre—certainly not the basis for a major improvement in mathematics performance by American students and what is needed to implement the new Common Core State Standards.

Future teachers were also asked to indicate the number and type of mathematics courses they had taken during their training, as well as the number and type of general pedagogy and mathematics pedagogy courses in which they had been enrolled. Because the amount of time available for teacher training is inherently limited, usually to about 4 years, many program choices are going to have to be made about how much emphasis to place on any of these three basic

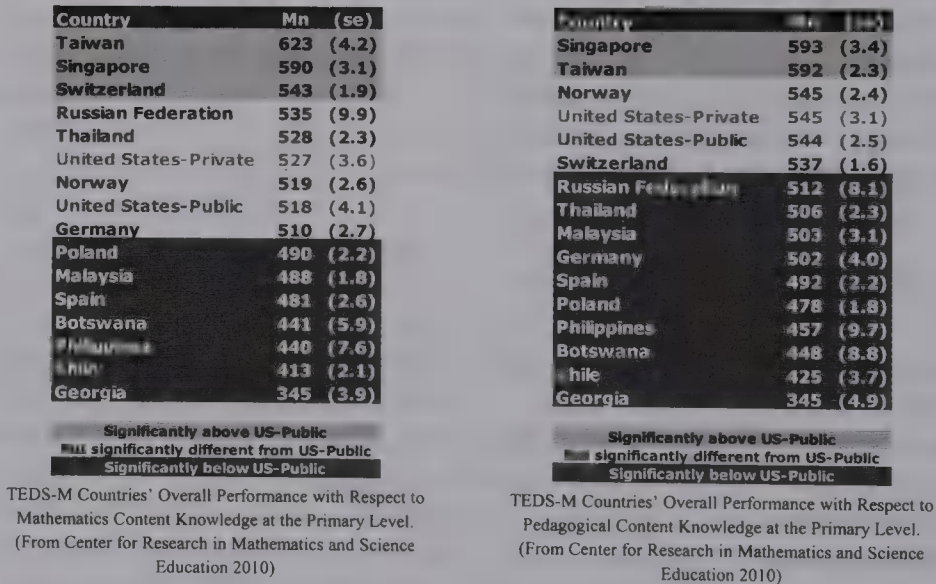


FIGURE 2 Teacher Education and Development Study in Mathematics (TEDS-M) countries' overall performance with respect to mathematics content knowledge and pedagogical content knowledge at the primary level. TEDS-M Countries' Overall Performance with Respect to Mathematics Content Knowledge at the Lower Secondary Level. (From Center for Research in Mathematics and Science Education 2010) TEDS-M Countries' Overall Performance with Respect to Pedagogical Content Knowledge at the Lower Secondary Level. (From Center for Research in Mathematics and Science Education 2010). (color figure available online).

areas: mathematics content, mathematics pedagogy, and general pedagogy. TEDS-M found that the allotment of time among mathematics content, mathematics pedagogy, and general pedagogy was roughly equal, with each receiving about one third of all available education training-related class time.

Is there a different amount of time devoted to mathematics content between U.S. future teachers and those in other countries participating in the study? On average the answer appears to be *no*. Although the highest achieving nations tended to spend a bit more time on mathematics content than did the United States, the difference was not statistically significant. There was also no discernable pattern in the types of mathematics courses taken by future elementary teachers in the highest performing countries.

Middle School Teacher Preparation

The story for future middle school teachers is even more troublesome. As found in the PROM/SE study of current middle school teachers in two states, there were no topics in which 75% of teachers expressed full confidence in their own preparation. TEDS-M also found serious weaknesses in the preparation of middle school mathematics teachers. Particularly alarming is that we would expect recent future teachers to do somewhat better, as they are still taking mathematics coursework. In addition, they are more recently trained than those already in practice, and given NCLB and other recent reforms one might expect that the standards for mathematics teacher preparation would have become more demanding.

U.S. future middle school teachers, both public and private, found themselves in the middle of the international distribution on mathematics content knowledge dividing the TEDS-M countries into two distinct groups: those countries in which eighth-grade students do better than the United States on international tests and those in which they don't—the only exception being Malaysia (see Figure 3).

There were major differences in the coursework taken by future teachers in the United States and those in better performing countries. Only 38% of the courses in the United States were mathematics content classes, compared with nearly half in Taiwan and Russia. Like Taiwan and Russia, American institutions devoted 30% of education coursework to mathematics pedagogy. The difference between the nations was that the greater focus was placed on general pedagogy (30%) in the United States. Given the usually unchallenging nature of the U.S. middle school mathematics curriculum, the fact that future middle school teachers did not spend a substantially greater amount of time taking mathematics content than elementary school teachers (38% vs. 33%) is not a great surprise.

There was also a noticeable difference in course taking of linear algebra and a yearlong sequence in basic calculus, both of which are basic foundations for more sophisticated mathematics content. In the four highest achieving countries, the vast majority (between 80% and 100%) of future teachers took these courses. By contrast, in the United States, only about two thirds of future middle school mathematics teachers took linear algebra, and between 50% and 60% took the basic two-course sequence in calculus. In addition, future teachers in the top six performing countries took on average two more upper level mathematics courses than their peers in the United States.

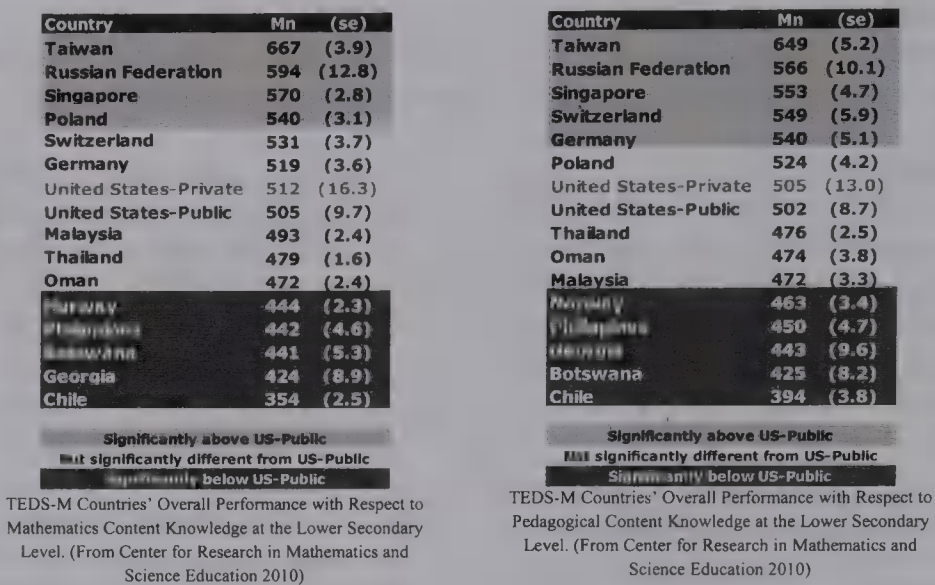


FIGURE 3 Teacher Education and Development Study in Mathematics (TEDS-M) countries' overall performance with respect to mathematics content knowledge and pedagogical content knowledge at the primary level. (color figure available online).

Teacher Preparation and the Common Core State Standards:
Some Policy Implications

The data collected from the TEDS-M study demonstrate that potential future teachers in the United States have less mathematics content knowledge relative to their peers in other countries. In addition, future middle school teachers have much less grounding in advanced mathematics than those in the highest performing countries, with fewer courses in advanced mathematics and less time devoted to mathematics content overall. The data also suggest substantial variation among future U.S. teachers in the amount of content knowledge. Assuming that there is a relationship between what teachers know about mathematics and their ability to teach mathematics to students, there is likely also a variation in the quality of mathematics instruction that students receive, a variation that is above and beyond that caused by tracking and variation in content coverage. Thus, the U.S. system is not only rife with inequalities but these inequalities are often compounded upon each other. Because the weakest teachers are often paired with low-performing and minority students, poor school districts are likely to have among the least challenging curriculum (Lankford, Loeb, & Wyckoff, 2002).

The challenge of providing effective teachers in every classroom is made all the greater by the adoption of the Common Core State Standards. The Common Core State Standards are rigorous, focused, and demanding—especially at the middle school level. This is all for the benefit of American students, but the lack of attention to implementation could prove disastrous. The mismatch between teacher preparation and the expectations mandated by the Common Core State Standards has been described as a “perfect storm” (Center for Research on Mathematics and Science Education, 2010), and for good reason. Forty-plus states will soon require middle school teachers to teach topics that they are not adequately prepared to teach. Their inability to

teach these topics effectively may well have less to do with their motivation or how hard they work and more with the fact that they are not adequately prepared to teach these subjects.

How can we improve teacher content knowledge? We must first recognize that this problem is twofold and must be treated separately. First, to the extent possible current teachers need focused capacity building (a need reported by a sample of Michigan and Ohio teachers as detailed in a previous section) aimed directly at the content knowledge needed to meet the standards in the Common Core State Standards. Research suggests that content-specific professional development can be very effective (Garet, Porter, Desimone, Birman, & Yoon, 2001). Unfortunately, a system of professional development on the scale required to affect significant change would be extraordinarily expensive, both in terms of money and time. Given current budgetary constraints, such an approach seems almost impossible.

Over the long term, the second focus must be with future teachers who have yet to enter the teacher labor market. Their training should be aligned with Common Core State Standards by improving the rigor of their mathematics training. Insights from the TEDS-M and Mathematics Teaching in the 21st Century studies suggest a dual approach involving both the recruitment of new teaching talent and an alteration to the nature of teacher preparation programs with respect to coursework and school-based experiences.

Part of the answer lies not in teacher training but in teacher recruitment, especially in elementary school. International studies do not suggest there is a major difference in the type of coursework received by the United States and higher achieving countries. The balance of coursework between mathematics content, mathematics pedagogy, and general pedagogy is roughly comparable across countries. The difference lies instead in the type of student drawn to a career as an elementary school teacher, and particularly in that student's background mathematics knowledge. In this respect the United States is at a fundamental disadvantage compared with other countries.

From international studies like TIMSS, we know that countries vary widely in their average mathematics achievement. International TIMSS mathematics data can therefore be used to define the pool from which future teachers are drawn. If we assume that future teachers across countries are drawn from roughly the same point in that country's distribution, then it becomes apparent that the United States will have a much more difficult time in finding teachers that are as highly knowledgeable as those in countries like Taiwan or Singapore (see Figure 4). The pool from which countries draw their future teachers is radically different, and as a consequence countries with high average mathematics achievement will find it easier to recruit teachers with substantial mathematics skills. Taiwan can recruit teachers from near the mean of its population, which is a fairly easy task. The United States, on the other hand, would have to recruit its top-performing mathematics students in order to be competitive on a global scale.

Improving the effectiveness of middle school teachers presents an even greater challenge. Not only does the United States face a recruitment problem, such as it does with future elementary teachers, but the nation must also confront the need to overhaul its teacher training programs. Future middle school mathematics teachers are prepared in three different ways: as part of a secondary program, as part of a unique middle school program, or as part of an elementary program with certification in K-8 teaching. There is evidence that the first approach might produce the strongest teachers. There were large differences (.75 to .9 standard deviations) in the TEDS-M study between those future middle school teachers prepared in secondary programs compared with the other two types of programs. This held true both for mathematics content knowledge and pedagogical content knowledge. The implication of these results is that teacher certification

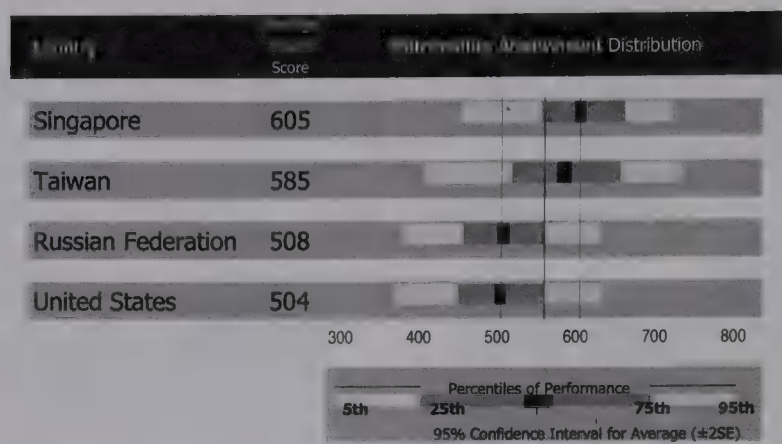


FIGURE 4 TIMSS 2003 eighth-grade mathematics achievement distributions (Source: Mullis, Martin, Gonzalez, & Ghrostowski, 2004). (color figure available online).

procedures have a substantial effect on middle school teacher content knowledge, which in turn impacts student performance. Certification procedures thus affect the equality of educational learning opportunities and the potential success of the Common Core State Standards.

Ensuring that teachers are capable of fulfilling the requirements of the Common Core State Standards requires policies that attract stronger mathematics students to the teaching profession. Once potential teachers have been recruited, policies should encourage additional mathematics courses during teacher preparation programs. Additional research needs to be conducted as to precisely which mathematics courses should be mandated, but as a preliminary baseline we might expect all future middle school teachers to take half of their teacher preparation course work in mathematics, including possibly such courses as linear algebra and a yearlong calculus course. This requirement seems reasonable given that other nations already demand such coursework from their future middle school mathematics teachers.

The substantially large variation in the average level of mathematics knowledge across colleges and universities that train teachers also needs to be addressed. Although some schools prepare teachers at an average level of mathematics knowledge commensurate with top institutions in other countries such as Taiwan, other schools display an average content knowledge similar to that of institutions in developing countries such as Botswana.

Perhaps it is time for a set of Common Core Standards for the training of teachers as well. The responsibility for improving the quality of teacher preparation lies not only with the colleges and universities but also with the states that are responsible for setting teacher certification standards. States that have adopted the Common Core State Standards may need to raise the bar on the requirements for certification, asking potential teachers to demonstrate a level of knowledge needed to teach the Common Core State Standards. School administrators, parents, and students have a right to expect mathematics teachers that are fully prepared to teach their subjects, regardless of that teacher's institution of origin.

We must find a way to break out of the disturbing cycle of a weak K–12 curriculum being taught to future teachers who then receive weak preparation and then are sent to a classroom to provide ineffective instruction. We have sufficient knowledge to develop reforms that will stop

this cycle and improve mathematics achievement. As the next section makes clear, we also have the public support needed to make these changes.

PUBLIC SUPPORT FOR CHALLENGING CONTENT STANDARDS

Education occurs within a cultural context, and educational systems and practices are inevitably shaped by that context. The degree to which educational systems and practices are determined by national culture has been the subject of heated debate—the extent to which teachers can borrow instructional practices from one country and successfully apply them in another (LeTendre, Baker, Akiba, Goesling, & Wiseman, 2001). What is relevant in the present situation is the relevance of educational *expectations*, which can have an effect both at the individual level (Davis-Kean, 2005; Goyette & Xie, 1999) and in the aggregate. Public attitudes can have a profound effect. For example, if there is a widespread belief that some students “can’t do mathematics” or that mathematics is not important, educational standards may fall. If it is believed that algebra is too difficult for all children to learn in the eighth grade, then policy may be shaped in light of this belief. The results would be different content standards for certain groups of students—one for those who “can” learn algebra and another (weaker) curriculum for those who “can’t.” This attitude probably contributed to the policy of tracking students. In education, as with other matters of public import, popular support is critical.

Given the constraints that public attitudes about mathematics education place on public policy, it must be asked to what extent the Common Core State Standards align with prevailing beliefs. Public opinion surveys suggest that the public does indeed support stronger mathematics standards. More than 90% of parents participating in the PROM/SE study saw a need for mathematics courses in every year of school (unpublished PROM/SE data). Strong support for continuous mathematics education also registered on surveys of Michigan parents, growing from 70% in 1994 to 80% in 2009. When asked exactly which courses should be required, Algebra I (92%), Geometry (81%), and Algebra II (67%) had the most support. The same survey found that 89% of those surveyed supported the idea that “a group of governors and business and education leaders from over 40 states are developing common grade level content expectations for the teaching of mathematics”—that is, the Common Core State Standards. There was also a high degree of confidence (74%) that such standards would improve student achievement.

The results of the Michigan survey have been replicated in broader national studies. A survey by the Public Agenda in 2009 indicated that 84% of parents believed their children should take advanced mathematics classes, 83% thought a national curriculum would improve mathematics achievement, and 91% believed that 4 years of mathematics courses would also have good results (Johnson, Rochkind, & Ott, 2010). Eighty percent thought that mathematics achievement had more to do with education than with native ability. Similarly, in a 2010 survey conducted by Achieve, 83% of voters believed that students should receive a more rigorous high school education, and 62% supported national standards. According to the 2009 Education Next survey, 72% supported common standards (Howell, Peterson, & West, 2009). Finally, mathematics has been rated as “extremely important” and “more in need of improvement” by more parents than any other subject (Harrison Group, Inc., 2009). Although none of these results specifically address the Common Core State Standards, they do suggest broad public support for a more rigorous mathematics curriculum.

In general, there is considerable anxiety about the state of education in the United States, which amounts to a high degree of support for more rigorous mathematics standards. Although parents recognize the importance of mathematics, they, too, are trapped in the vicious loop of weak mathematics skills begetting weak mathematics skills. Parents have expressed frustration at their lack of ability to assist their children in mathematics—so much so that they feel more comfortable talking to their children about illegal drugs than about mathematics (Intel, 2009). An alarming 34% of parents would accept a child stating that they are “not good at mathematics” (Harrison Group, Inc., 2010), and 20 to 25% of parents think the ability to learn mathematics is hereditary (Harrison Group, Inc., 2010; Johnson et al., 2010).

Sufficient support for the Common Core State Standards, however, should not be presumed. Simply because the public is open to the idea of common national standards does not mean that long-term backing can be taken for granted. Standards and assessments are often linked in public opinion surveys and in public discussion, and there remains considerable opposition to standardized testing and the accountability system of NCLB. It is vital that as the Common Core State Standards move forward, policymakers preserve the distinction between content standards and assessment standards. Further, stakeholders must maintain and enrich the emerging consensus in favor of standards if the Common Core State Standards project is to be successful.

FINAL THOUGHTS

We have argued that three of the most critical factors affecting mathematics achievement are the curriculum, the teachers who teach this curriculum, and the external support for this curriculum from parents and the public. This is not to suggest that other factors do not also have an influence on educational outcomes. Student motivation, adequate resources, sound leadership, and a host of other elements also contribute to mathematics education. But we believe that a strong curriculum, effective teacher preparation, and the right kind of public participation can play a powerful and significant role in improving students’ ability to learn mathematics. These factors have a critical effect because of their interdependence. The curriculum defines the core of the learning experience (content, skills, and reasoning abilities learned by students) delivered to students by a teacher. To be effective, the teacher must know content and be able to present it to students in an accessible fashion. Parents and the public must also support the curriculum and the teacher by endorsing the importance of rigorous mathematics courses. The failure to generate sufficient support and the lack of a consensus about goals can lead to debilitating conflicts, such as the “math wars” that still persist in some communities today.

To refresh an analogy we mentioned earlier, we think that the United States stands at a precipice. We have reason to hope that the Common Core State Standards represent the beginning of a process of creating standards that will promote excellence, but we succeed only if we recognize that teachers and the public are an essential part of this endeavor. Teachers need to have the knowledge and skills necessary to teach according to the new standards, and they must also have the support of the community. Without these factors, the Common Core State Standards project has no hope for success.

Yet we are only at the beginning of what will surely be a long and difficult process. The Common Core State Standards are in place, but the problem of implementation remains an unaddressed issue. We have yet to begin the task of providing content-driven capacity building

professional development for teachers. Focused, coherent textbooks have to be written. Tests must be produced. Certification requirements related to mathematics need to be overhauled. Colleges and universities must begin to reexamine their course requirements and the way they employ K–12 school related experiences for future teachers.

The task is daunting, but the framework that unifies it is now in place. Public awareness of the importance and immediacy of the task is in place as well. It is up to us, as a nation, to follow through and complete the task. Standing at the precipice, it seems as if this is the only way that allows us to step back from the edge and avert the disaster that awaits our children and perhaps even our nation.

AUTHOR BIO

William H. Schmidt (Ph.D., psychometrics and applied statistics, University of Chicago) is a University Distinguished Professor at Michigan State University and the Director of the Center for Study of Curriculum. He also serves as co-director of the Education Policy Center, co-director of the U.S.-China Center for Research, and holds faculty appointments in the Departments of Statistics and Educational Psychology. Previously he served as National Research Coordinator and Executive Director of the US National Center which oversaw participation of the United States in the IEA-sponsored Third International Mathematics and Science Study. He has published in numerous journals and has co-authored nine books, including *Why Schools Matter*. His current writing and research concerns issues of academic content in K–12 schooling, assessment theory and the effects of curriculum on academic achievement. He is also concerned with educational policy related to mathematics, science, and testing in general. He was awarded the Honorary Doctorate Degree at Concordia University in 1997, received the 1998 Willard Jacobson Lectureship from The New York Academy of Sciences, and is a member of the National Academy of Education. In 2009, he was elected in the first group of Fellows in the American Educational Research Association.

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May 2012

School Leadership and Change in East Asia: Building Capacity for Education Reform

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Hong Kong Institute of Education

In recent decades the East Asia region has demonstrated some of the most dramatic gains in social and economic development. This applies to the region's education systems as well, which have undergone rapid transformation in an effort to reshape and align educational practices with new goals. Nonetheless, this diverse region still faces significant challenges in achieving educational equity and quality.

As in many other parts of the world, a common theme shared by educational systems in East Asia is *change*. Both external and internal forces are currently generating the momentum for this change (Cheng & Walker, 2008). Externally, macro political landscapes are shifting with global conditions of economics, ecology, demographics, and technology (Guthrie & Wong, 2007). Meanwhile, within individual societies, traditional sociocultural values and norms that underline educational practice are undergoing gradual but significant transformation (Hallinger, 2004). In response to these change forces, East Asia's societies have taken educational reform initiatives at multiple levels such as resetting national priorities, increasing community involvement, decentralizing school management, and developing site-based curriculum and technology (e.g., Cheng, 1999; Hallinger & Lee, 2011).

The belief that there are general and common elements in contemporary international educational policy (Ball, 1998; Carnoy, 2006) has resulted in growing interest in sharing theories and successful models of effective schooling across cultures. This interest is particularly strong with respect to countries in East Asia that are at the beginning stage of establishing a knowledge base both theoretically and empirically (Chu, 2003; Hallinger, 2011; Hallinger, Walker, & Bajunid, 2005). The interest is no longer one-way, however; evidence of the increasing competitiveness of countries in East Asia has prompted reciprocal interest between "East" and "West" school systems (Dimmock & Walker, 2000; Hallinger, 2011). With growing concerns over education quality in the United States and other developed countries, international benchmarking has created a new curiosity as well as exploration into East Asia models of teaching and learning (National Governors Association, 2008).

The articles selected for this issue focus on education systems recognized for their high performance in large-scale international assessments such as the Trends in International Mathematics and Science Study (TIMSS) and the Program for International Student Assessment (PISA). Among them, Singapore, Hong Kong, and Taiwan have long been the front-runners of international assessments. China is a newcomer to this group, with Shanghai recently becoming one of the top performers on PISA 2009 (Ferraro & Van de Kerckhove, 2006; Mullis, Martin, & Foy, 2008; Provasnik, Gonzales, & Miller, 2009). This impressive success on international tests has been described as the “decided academic advantage” (Jeynes, 2008) of the East Asian systems. However, concerns about whether these results reflect the true education quality of the nations involved, as well as whether these results will impact traditional methods of instruction, accompany many nations’ success on tests such as PISA and TIMSS. In fact, at various junctures within the past 20 years, Singapore, Hong Kong, Taiwan, and China have each embarked on major initiatives aimed at providing higher quality education to a broader population. Concerns have been particularly keen on the trade-offs between teaching and learning goals and processes that are too narrowly defined by standardized testing.

As active participants in the global economy, policymakers in East Asia have increasingly urged their education systems to move from the delivery of basic skills and rote learning to the development of advanced and complex skills (Cheng, 1999; Hallinger & Lee, 2011). Consequently, the region’s education systems have converged on a set of reform strategies that promote decentralized school management, professional learning communities, school-based curriculum, problem-based and student-centered instruction, and enriched connections between schools and their communities (OECD, 2010). In China, Hong Kong, Taiwan, and Singapore, the needs are similar to those of other education systems: effective principals, qualified teachers, professional forms of work organization and accountability, and enhanced forms of professional practice.

It is in this context that we offer this special issue focusing on school leadership and change in East Asia. Our goal is to stimulate and facilitate dialogues among researchers of education policy in the Asia-Pacific region. Articles for this issue were selected from submissions to the first Asia Leadership Roundtable held in 2010 in Hong Kong. Sponsored annually by the Asia Pacific Centre for Leadership and Change at Hong Kong Institute of Education, the Roundtable promotes dialogues and collaboration among scholars, ministry-level administrators, and practitioners on capacity building for leadership development in Asia Pacific.

Articles in this issue share several important features. First, there is a focus on addressing the challenges of *reform implementation*. According to Cheng (2002), the whole life cycle of education policy includes four frames: formulation of policy objectives, policy formulation, policy implementation, and policy outcomes. It has long been realized that the effectiveness of policy implementation largely determines quality of outcomes (e.g., Elmore, 1995; McLaughlin, 1990). Reviews of major large-scale education evaluations in the United States found large between-school variation in implementation and showed that the within-school variation in implementation is often as great as or greater than variation between schools (e.g., Desimone, 2002; Gamoran, 1992). International literature on reform implementation in the East Asia region has also identified significant discrepancies between national policy intentions and local implementation (Hallinger & Lee, 2011; Hiroso, 2001; Kim, 2006; Ng, 2006). In this issue, Walker and Qian (2012/this issue) examine the “reform disconnection in China,” where national curriculum reform was enacted in 2001 as a major measure of the Quality-Oriented Education (*suzhi jiaoyu*) initiative. Using a framework that unpacks disconnections into five elements—instrumental, intellectual, political,

cultural, and communicative—the authors provide a critical review of the reform landscape and identify weak links in implementation strategies. Joong (2012/this issue) also examines reform implementation in mainland China. He employs a framework that explores the “ecologies of education reforms” in China through the differing perceptions of teachers, students, and parents. His survey study finds that the national examination system remains a key obstacle to curriculum and instructional reform, leaving little room for the reform of the learning process.

Successful implementation is complex and must take into consideration local political factors and contextual differences among districts, schools, and classrooms, and more important, the roles of multiple stakeholders. In this issue, the authors treat *the leadership of school principals and their teams* as an anchor for school effectiveness and also as the focal point of reform implementation. For example, Ng and Ho (2012/this issue) examine the design and implementation of information communication technology within the context of Singapore’s education systems, finding that the distribution and management of effective learning technology occurs through functions of transformational, instructional, and emotional leadership.

Articles in this issue posit that *capacity building* for principals and their leadership teams is a key lever for effective school leadership and for reform implementation. The nature of leadership capacity, however, must take into account the sociocultural and political contexts in which leaders work. Reflecting this fact, this issue also demonstrates that East Asian leadership tends to reflect long-held values of harmony, collectivism, social hierarchy, and sense-making.

In Hong Kong, for example, Ho (2012/this issue) takes an in-depth look at the decision-making process of preschool principals who must balance the needs of stakeholders and defuse power struggle tensions between centralization and decentralization of leadership. Ko, Hallinger, and Walker (2012/this issue) connect features of principal leadership and school conditions with school performance over time. Their longitudinal study highlights the synergistic effect of a combined set of factors that lead to the improvement of schools, where professional learning communities are particularly strong indicators of school capacity-building. In Taiwan, the rotation schedule of principalship (every 8 years) heightens the importance of cultivating a self-reliant environment of teaching and learning. Lin’s (2012/this issue) survey study in Taiwan examines feedback from high school principals and explores effective ways to build professional community and sustain improvement efforts. In their comprehensive review of the landscape for school principal professional development in China, Chu and Cravens (2012/this issue) identify the major challenges and opportunities presented by the Quality-Oriented Education reform and propose a capacity-building framework that aligns the core components of reform implementation: educational reform priorities, school effectiveness criteria, and professional development activities that coherently incorporate principal evaluation, training, feedback, and coaching.

This issue seeks to highlight research-based knowledge on the practices of leading change, innovation, and school improvement in East Asia. The articles posit that leadership development is imperative to initiating and sustaining change within schools coping with the new reform policies of the East Asian region. As the Chinese often say modestly, this effort is “a brick thrown to attract jade.” We hope that this issue will stimulate the formulation of a new agenda for school leadership studies in the Asia-Pacific region (Hallinger, 2011), calling for (a) an examination of the geographic, cultural, and political terrain of the current knowledge base in educational leadership and management; (b) an assessment of the global knowledge base’s relevance for the Asia-Pacific Region; (c) a consideration of the current practices of the university-based education

and research culture in the region; and (d) a series of strategies for accelerating the development of educational leadership and management within the region.

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Reform Disconnection in China

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This article examines many of the frustrations associated with implementing education reforms in mainland Chinese schools. Our basic argument is that when taken individually, many of the recent reforms are beneficial, but when parceled together and thrust hastily at schools, they are unwieldy and disconnected. We suggest that the inability of the reforms to impact schools is due in large part to their lack of sufficient connection to the reality of school life, to each other, to educative and public perceptions, and to the political and cultural context of China. We discuss and illustrate these issues under headings of instrumental, intellectual, political, cultural, and communicative disconnections.

On September 4, 2009, the Chinese Premier Wen Jiabao spent a morning sitting in one eighth-grade class at Beijing No. 35 Middle School. He sat through Mathematics, Chinese, Research-Based Learning, Geography, and Music lessons. When the morning classes were finished he spent almost an hour commenting on each of the classes to a group of Beijing teacher representatives.

The fact that the supreme leader of China's governing party observed these lessons was not particularly unusual—it has long been a tradition for high-ranking political leaders to visit schools and talk with teachers before the annual Teacher's Day (observed on September 10). What made this visit unique was that Wen Jiabao spent a full half-day observing students learning and the same amount of time talking with teachers about what he saw.

In his comments to teachers, Premier Wen praised the achievements flowing from 30 years of education reform but also stressed the serious problems those same reforms had failed to address. He challenged the teachers by asking a number of questions. One of the most challenging was, "Why is there still a lack of confidence in our education reforms and distrust of our education system, despite the progress we have achieved in terms of the quantity and quality of education?" His concern was that, even after 30 years of intensive reform, the Chinese education system neither was able to meet public and societal expectations nor could satisfy the escalating national demand for talented workers (Wen, 2009).

At the time of Premier Wen's visit, China was engaged in formulating the most important education policy of the new century. The first draft of the policy was launched on February 28,

2010, and was later released as *The National Guidelines for Medium-and Long-Term Educational Reform and Development 2010–2020* (Ministry of Education of the PRC, 2010). The policy firmly entrenched the twin goals of equity and quality as the future of improvements to education in China.

For the first time, the steps taken to formulate a national education policy included a process of open consultation with the public. The first consultation phase ran from January to February of 2009. More than 2 million suggestions and 14,000 letters were received (Xinhua News, 2010). Among the most widely discussed issues were the heavy workload of students, low teacher pay, and the highly political nature of higher education. A second public consultation ran from February 28, 2010, to March 28, 2010. This second round of consultation attracted 27,855 opinions and suggestions by mail and 2,490,000 through the media (Gu, 2010).

The staggering number of suggestions, criticisms, and comments during these two consultation periods indicates that education is one of the top concerns of the Chinese people, sending a clear signal that people are dissatisfied with educational development. As Premier Wen repeatedly stressed throughout the consultation process, the new *Guidelines for Medium and Long-Term Educational Development 2010–2020* needed to be meaningful enough to inspire people's interest while also firm enough to reclaim their confidence in education (Xinhua News, 2010).

In this article, we address the widely held belief that education reform has not delivered as proposed or promised in China (Qian & Walker, 2011). Our purpose is to question why and how reform efforts have frustrated the Chinese education community. We do not attempt to debate the merits of individual reform initiatives; rather, we examine the connections, or lack thereof, within and between them. We take this tack because there appears to be general agreement that when taken individually, most reforms have resulted in positive outcomes or have had the potential to do so. Evidence of their benefits includes the fact that all public school students are now provided with 9 years of free compulsory education and about 70% of high school graduates have the opportunity to engage in some form of higher education.

Despite the positives, the untoward effects of China's disconnected reforms have accentuated the time and workload demands of students, and have also failed to address major inequities. Although students now have greater access to higher education, those attending elite schools in larger urban areas have a much higher chance of progressing to the tertiary level. Even though schools have been frantically implementing the new curriculum reform initiated in 2001 (the details of the reform are discussed next), much of the teaching remains rigid and teacher centered as teaching for creativity and critical thinking remains thin on the ground. In sum, when viewed more closely and as a collective, the rush of reforms has so unsettled schools and the public that their efficacy has been increasingly questioned.

This article is divided into four sections. The first section outlines the broad reform environment in China since the first important education reform policy of the post-Mao era issued in 1985. We do not attempt to paint an all-inclusive picture of the reforms, but instead seek to provide a general portrait of some of the more influential initiatives. The second section outlines the disconnection framework developed by Walker (2004, in press). The third section illustrates the five points of disconnection we suggest impede successful implementation of the reforms. Although these points of disconnection are discussed under separate headings, in reality they are demonstrably entangled, with each influencing the others. For example, intellectual disconnection—essentially the lack of coherence and consistency between and within reforms—accentuates instrumental disconnection—the lack of coherence between the demands of the reforms and the realities

of teachers' lives. Discussion under each of the disconnection points and any accompanying commentary can do little more than scratch the surface of what are extremely complex and value-laden issues. The final section suggests a number of key "connection" challenges facing mainland Chinese educators. All discussion is bounded by the reality that educational policy, particularly at the school implementation level, constantly interacts with shifting local conditions and cultures that filter its shape and efficacy, and that different groups may well see the reality of the reforms in very different ways.

THE CHINESE REFORM CONTEXT

Education reforms in China flow from a diverse collection of political, social, and economic rationales; stand at different points in terms of their visibility and implementation; and tend to reflect global educational trends. As in many other societies, there is a general consensus that economic development depends on adequate education. This is apparent in the way education policies in China mirror those implemented in Western societies—even to the extent of adopting the same nomenclature such as devolution, marketization, information literacy, and school-based technology (Cheng, 1997, 2010; Mok, 2009a, 2009b). Despite their willingness to introduce quite radical reforms, Chinese policymakers remain reluctant to address certain components, including the role schools play in ideological training and the impact of high-stakes exam system. Thus, concerns over change *and* stability typify the education reform environment in China. This section lists the major reform initiatives in chronological order before focusing on important policies instituted over the past decade or so. Table 1 summarizes the main education reforms instituted since 1985.

Recent reforms in China have centered on the amorphous concepts of improving the "quality" and "equity" of education. Quality education (*suzhi jiaoyu*) has become a major policy goal. Although the term was originally raised as the antithesis to "examination-oriented education," the quality rhetoric has endured and continues to act as a broad framework for the major goals of many current reforms (Li, 2004). The increasing emphasis on quality also signals that the reform focus has shifted to the improvement of schooling, teaching, and student qualities. A series of national reforms have been initiated since quality education arrived on the stage of "full-scale promotion" in 1999 (Li, 2004). Among the most significant of these reforms is the 2001 national curriculum reform.

In June 2001, the Chinese Ministry of Education (MOE) initiated a new round of national curriculum reform. This reform involves the basic education system as a whole, including 6 years of primary education, 3 years of junior secondary education, and 3 years of senior secondary education. It is an ambitious reform aimed at bringing about major curriculum and instructional change. The following are some examples of the changes made to the senior secondary school curriculum:

- replace the existing subject-based senior secondary school curriculum structure with a three-level structure consisting of learning fields, subjects and modules;
- adopt an elective course and credit system;
- give students the opportunity to choose their courses;

TABLE 1
Major Education Reforms in China Since 1985

Year	Document Release	Major Initiatives
1985	■ <i>Reform of China's Educational Structure: Decision of the Central Committee of the Communist Party of China</i>	■ Authority should be “devolved” to lower levels ■ Multiple methods of financing should be sought ■ Schools should gradually start to adopt the “principal responsibility system” ■ Party functionaries should be separated from the day-to-day running of schools
1993	■ <i>Outline for China's Educational Reform and Development</i>	■ Reaffirmed the direction of education reform set by the 1985 initiative ■ Provided enough space for those at the local level to take increased responsibility for basic education in terms of both management and finances ■ Stated that the “state” remains the arbiter of rules and regulations ■ Reaffirmed that all schools should adopt the “principal responsibility system”
1995	■ <i>Education Law</i>	● Confirmed the major principles of PRC educational funding under market economy conditions, that is, the bulk of educational expenditure would come from central government grants, while schools were encouraged to seek alternative channels
1996	■ <i>Ninth Five-Year Plan for National Economic and Social Development and the Long-Term Outline Objectives for the Year 2010</i>	■ Called for “switching the mode of training professionals from examination-oriented education to all-round quality education”
1998	■ <i>Action Scheme for Invigorating Education Towards the 21st Century</i>	■ Reiterated the move towards decentralization and marketization and achieving quality education
1999	■ <i>Cross-Century Quality Education Project</i> ■ <i>Decisions on Deepening Education Reform and Promoting Quality Education in an All-Round Way</i>	■ Requested that the focus of quality education be shifted from pilot projects to full-scale implementation ■ Aimed at mobilizing the nation to implement quality education
2001	■ <i>State Council Decision on Reform and Development of Basic Education</i>	■ Further recognized quality education as a major goal of the nation's Tenth Five Year Plan
2010	■ <i>The National Guidelines for Medium- and Long-Term Educational Reform and Development (2010–2020)</i>	■ The general strategy of educational development over the next 10 years is “giving priority to education, placing primary concern on the education of students, initiating reforms and innovations, promoting equity and improving quality” ■ Identifies three goals to be achieved by 2020: to achieve basic modernization of education; to enable a learning society to take initial shape; and to build up a country rich in human resources.

- improve students’ generic skills of independent inquiry, cooperation, communication and problem-solving; and
- establish a formative evaluation system and connect students’ academic performance with their growth portfolio. (Ministry of Education of the PRC, 2003)

Running alongside the quest for quality are a powerful assortment of initiatives designed to promote “equity.” These reforms are aimed at narrowing the achievement gap between students from different backgrounds and between schools with different resource bases, as well as at tackling the vast economic development discrepancies between different provinces and regions. China’s achievement of the goal of free compulsory education (6 years primary education and 3 years junior secondary education) for all students is perhaps the most powerful example of “equity policy” to have been implemented over the past 5 years. The policy has benefited 150 million students from 400,000 rural schools and 2,871,000 students from 25,900 urban schools (Xinhua News, 2009). After years of being treated as pariahs in the big cities, migrant workers can now send their children to local public primary and junior secondary schools without paying additional fees (Cheng, 2010). Special policies have also been initiated to avoid the overconcentration of resources in a small number of schools, thereby providing more opportunities for all schools to provide a “quality education.”

The huge gap between schools was a legacy of a school classification system implemented in the 1950s. At that time, the fledgling People’s Republic was in desperate need of talent to rebuild the nation after years of war. “Key schools” were therefore set up to identify and prepare the most promising students for higher levels of education (Cheng, 2010). In the state-controlled system, key schools were assigned greater financial resources and better teachers, recruited the most academically capable students, and not surprisingly produced the best student outcomes. The non-key schools, or ordinary schools, did not have these privileges. In short, the key school policy channeled a disproportionate share of resources to a small number of highly selective schools.

Recognizing the inherent dangers of this policy, the Education Commission (renamed the MOE in 1998) decided that the key school system would extend only as far as the end of compulsory education (Education Commission, 1997). Adoption of the *key school* title at the senior secondary school stage was also discouraged. Shanghai, for example, adopted an exemplary school system (Shanghai Education Commission, 1999, 2004). The general principle of the new system was that all kinds of schools, whether previously categorized as key or ordinary, could apply for designation as an “exemplary school” as long as they could demonstrate they had successfully embraced the expectations associated with quality education. The ultimate aim was for exemplary schools to take the lead among senior secondary schools in successfully implementing quality education.

Our purpose to this point has been to paint a broad-brush picture of the crowded reform environment. Within the space of about a decade, multiple policy initiatives targeted almost every aspect of school education ranging from curriculum and assessment to management and student admission. Unsurprisingly, public expectations for reform outcomes have been and continue to be high and, at least at this point in time, largely unfulfilled (Ke, 2008; Yin, 2009). As the education community continues to struggle to understand and implement the reforms issued over the past decade, a host of concerns and challenges have become apparent. Many of the challenges presented by the reforms stem from an interrelated series of what we label *disconnections*. The following section explains the disconnection framework adopted in this article to analyze the reform context in China.

THE DISCONNECTION FRAMEWORK

This article uses the disconnection framework developed by Walker (2004) to examine the reform context in China. The framework has been used previously to understand reform dynamics in Hong

Kong (Walker, 2004) and IB program transitions in international schools (Hallinger, Walker, & Lee, 2010). The framework provides a useful lens to help disentangle the complexities of reform implementation. Disconnection refers to a lack of linkage or understanding between different reform components, purposes, or intentions and to a breakdown between what reforms propose and the processes that make them “work.”

In other words, a persistent lack of relevance and acceptance of many reforms stems from a failure to connect their purposes and priorities. This problem of disconnection appears to have at least instrumental, intellectual, political, cultural, and communicative elements that combine to lessen the contextual relevance of the reforms, thereby actively hindering their meaningful implementation in schools (Walker, 2004, in press).

The disconnection framework provides a useful lens through which to investigate education reform in China. Its purpose is to expose implications for educators, particularly those who tend to view policy from a macrolevel. The framework is useful in a number of ways. First, it provides a holistic tool to view the educational reform environment, rather than just individual reforms. As such, it locates reforms within the macro-societal-cultural context rather than in a vacuum. Second, for policymakers, the framework can help to identify the forms of disconnection needing immediate attention. This may lead to the formulation of more timely and relevant implementation strategies. When policymakers use the framework to better understand where reform gaps lie, they can (ideally) work to prevent such disconnections in future policy endeavors. Third, for researchers, the application of the framework in a specific context can guide the collection of empirical data to support and/or build theoretical models. This intellectual exercise may allow researchers to uncover problems that lurk beneath the façade of policy effectiveness.

- *Instrumental disconnection.* Refers to disconnection between what the reforms demand and the practical realities of learning and teaching in and leading schools.
- *Intellectual disconnection.* Refers to the disconnection between purpose, thrust, and content both within and between different reforms. This type of disconnection has at least two faces—a lack of coherence and a lack of consistency. *Coherence* relates to whether different reforms are explicitly linked to one another. *Consistency* refers to the uniformity of the messages conveyed by individual reforms and the extent to which they are open to interpretation by the various actors involved.
- *Political disconnection.* Refers to disconnections between the reforms, the broader governance and political structures, and the established order underpinning the life of the Chinese education system. It also refers to disagreement over the political rationale and ideology behind the reforms. Political disconnection also occurs at a more microlevel—within the school.
- *Cultural disconnection.* Refers to disconnection between what the reforms demand and the cultural realities of teaching in and leading schools. It differs from instrumental disconnection in that it focuses on values and ingrained understanding and behavior rather than the more overt structural features of schools.
- *Communicative disconnection.* Refers to deficiencies in *how* reforms and their outcomes are explained, communicated, and sold within and outside the education community.

These interrelated disconnections have combined to create a cleft that endures not only between the substantive features or structures envisioned by reform policies but also between such substantive

features and structures and the processes that make them “work” at the school level (Van der Vegt, Smyth, & Vandenberghe, 2000).

Building around a number of current data sources, most of which are written in Chinese, this article utilizes the set of interrelated disconnections as a way to analyze the implementation of educational reforms in China at the school level. Sources include published and unpublished research reports; discussions in influential Chinese newspapers, professional journals; and the relevant national, provincial and district policy documents. These sources provide a level of insight into education reform that is relatively less prevalent in the international literature. The next section shows how these secondary data sources define and illustrate the five major reform disconnections in China.

REFORM DISCONNECTION

Instrumental Disconnection

Instrumental disconnection refers to the disconnection between what the demands of the reforms and the practical realities of teaching, learning, and leading schools. Not enough thought is given to how reforms can be successfully implemented in line with the structural realities of life in mainland schools. Among the questions that may be asked in this context are the following:

- Do reform demands take account of the existing context of schooling and the working lives of students, teachers, and principals?
- Has sufficient consideration been given to the time and other resources needed to implement reforms?
- Are there simply too many reforms to implement?
- Is there any clear priority indicating which reforms are “more important” than others?

One example of this type of disconnection can be seen in implementation of the 2001 national curriculum reform. The curriculum reform introduced a host of new concepts to schools such as school-based curriculum, self-initiated learning, and inquiry-based learning. These are worthwhile reforms when assessed individually, but they pose considerable challenges when injected too quickly into organizations familiar only with “teaching for the test.” Inquiry-based learning presents a case in point.

The new syllabus as stipulated in the national curriculum reform includes a new module called “comprehensive practice.” Within this module, inquiry-based learning comprises 15 of 116 credits and is a required course in all senior secondary schools (MOE, 2003). Reformers have thus positioned inquiry-based learning as one of the most “valued” courses in the curriculum. It is now worth more credits than traditionally important courses such as Chinese, foreign languages, and mathematics (each of which is worth only 10 credits). The government’s dedication to this course of action shows the strength of its resolve to change the long-standing traditions of teacher-centered learning and students-as-passive-learners to student-centered teaching and learning. However, the reality is that each school must still perform well on the national college entrance examination (the high exam, *gaokao*) if it is to be ranked as successful both officially and unofficially. Given that inquiry-based learning is *not* examined, it is not regarded as vital to the quality of a school and therefore its “attractiveness” falls among parents.

Consequently, schools have incorporated inquiry-based learning into their curriculum but have done little to support the purpose of the initiative: to foster students' critical thinking and research ability. Ke's (2008) study in Jiangsu province illustrated how school principals muddled through the new reform "in a serious way." Schools admitted that they could not spare enough teaching hours (equivalent to 15 credits) for inquiry-based learning. They believed the requirement was out of sync with the reality of school life. As one principal said, "It is a totally blind top-down requirement. They even require senior-3 students to take the inquiry-based learning courses. I am sure none of the high schools in our province opens this course for senior-3 students."

By "in a serious way," Ke (2008) implied that schools were careful to ensure they looked like they were implementing the change in a meaningful fashion, when in fact they were scheduling it in "garbage time." In other words, they scheduled research courses during the last teaching session of the day or on the final half day before weekends or holidays. Given that students were given only a limited time to conduct their research projects, most chose to fulfill the task by downloading documents from the Internet. Even though most schools did not actually promote inquiry-based learning, they did not seem to worry about external inspections. When talking about how to deal with such inspections, school principals often said they simply "did some paperwork." In other words, they would prepare a set of "fake" documents such as a course syllabus and students' projects to demonstrate that the school had met the 15-credit requirement. Thus, the adoption of inquiry-based learning brought about superficial change at best.

Intellectual Disconnection

Intellectual disconnection refers to the disconnection between purpose, thrust, and content both within and between different reforms. It has at least two faces—a lack of *coherence* and a lack of *consistency*. As used here, *coherence* relates to whether different reforms are explicitly linked to one another, whereas *consistency* refers to the uniformity of the messages conveyed by individual reforms and the extent to which they are open to interpretation by the various actors involved. Basic questions about coherence include:

- Are the reforms targeting "quality" coherently connected to one another?
- Are the multiple thrusts of the reforms coherent? That is, are the reforms purposefully linked to one another?

Intellectual disconnection also poses challenges for consistency. Questions about consistency deal with whether the thrusts within individual reforms cause confusion by proposing apparently contradictory purposes. A sample question might read as:

- Are the thrusts of the same reforms consistent with each other? That is, do the same reforms convey contradictory meanings to those charged with implementing them in their organizations?

A lack of coherence refers to disconnection between different reforms (often launched by different branches or divisions of the central bureaucracy). One example of this brand of intellectual disconnection is the lack of consistency between reforms aimed predominantly at school management and those aimed at the curriculum. Although policies such as the 2001 national curriculum

reform encourage schools to design a curriculum structure “unique” to themselves, the broader structure of the system, school governance practices, and evaluation initiatives constrain schools’ ability to explore the space available for pursuing “uniqueness.”

Specifically, with the implementation of the quality education reforms, schools must ensure that they are not only academically outstanding but also unique in other ways. The government pressures each school to highlight its distinguishable features. The slogan “encouraging schools to navigate a way of schooling with their own characteristics” has appeared in many policy documents and government leaders’ speeches. However, schools often have limited room for self-initiated change under the current administrative system. As a principal recently observed, “If you do something your superiors do not endorse, then you risk losing your principal position” (Walker & Qian, in press). Another leader stated, “You have to give the fulfillment of regulations a priority. When you put more time and energy on fulfilling the requirements, there will be fewer self-initiatives of the schools” (Qian, 2009, p. 203).

For example, if a school wants to distinguish itself from others in terms of curriculum innovation, then the principal must be empowered to select, promote, and dismiss teachers. However, the personnel reform does not grant such autonomy to principals. Their autonomy to recruit, promote, and assess teachers is limited in three ways. First, the local education bureau prescribes how many new teachers a school can recruit. In China, each state-recruited teacher has a public *bianzhi* (loosely translated as “establishment post”). Thus, schools must have unfilled *bianzhi* quota places before they can hire new members of staff. Second, even if a principal selects a preferred candidate after going through an open recruitment process, the decision to hire an individual must be approved by the school’s superintendent to avoid the likelihood of the principal’s preferred candidate being vetoed by the local education bureau. Third, although principals have more autonomy to promote midlevel leaders such as year-group heads, the local education bureau usually appoints assistant principals, who are often barely known to the school principal.

Whereas coherence deals with separate reforms, consistency refers to uniformity among the messages conveyed by individual reforms. The “Principal Responsibility System” launched in 1985 is an excellent example of how Chinese education reforms have lacked this quality (The State Council, 1985). The “principal responsibility system” positions the principal, rather than the party secretary, as the person who actually runs the school. The system formally stipulates that principals can make decisions independently on such matters as student admissions and teacher assignments without having to consult with Chinese Communist Party functionaries (Delany & Paine, 1991, p. 36). The policy is aimed at granting principals the autonomy to promote teaching and learning in schools. However, in actual practice, different actors, depending on their perspective, their position, and their role in the system, interpret this purpose differently.

Although the “principal responsibility system” appears to promise principals more autonomy, it also makes principals more accountable to the public for academic performance and resource utilization. Various performance indicators have been adopted to review the performance of schools, principals, and teachers. Furthermore, whereas principals see the system as an attempt by government officials at various levels to deflect responsibility for any perceived failure among schools, teachers tend to see it as an overuse or abuse of principal power. Principals are in practice required to take on many responsibilities they neither need nor want. Teachers are often targeted when these additional responsibilities are exercised, whereas the burden these responsibilities impose on principals distracts them further from focusing their energy on teaching

and learning, thus perpetuating the disconnection. As a principal interviewed for Qian's (2009) study complained,

For example, if a woman teacher gets pregnant and wants to have a second child, it is the responsibility of the principal [to persuade her not to deliver the baby]. Otherwise, the school cannot get the title of Model Unit. Is this a principal's responsibility? [Another example], one teacher's family refuses to move [in line with] the [city's] residential demolition and eviction [order]; then it is also the principal's responsibility to [persuade them to move]. Is this also the principal's job?

The fact that many educational actors interpret some reform policies differently further obfuscates those policies' implementation. Although there may be few actions central authorities can take to combat such differing interpretations, better communication, more explicit linkages to other reforms, and increased resources to support reform initiatives could help. These possibilities are further explored in the discussion of communicative disconnection.

In sum, intellectual disconnection—where the purposes of reforms, links between reforms, and the structures within specific reforms are unclear or even contradictory—has led to what the Minister of Education terms “the deep ends of the pool” (China News, 2010a). There is a lack of focus and linkage that causes schools to try to do much on behalf of students without really understanding what they are doing or how what they do fits together. This is true even when individual reforms are valued. Thus, prioritization and purpose again rise to the forefront of the discussion, as does an effort to more explicitly examine linkages between major reforms and within individual reforms.

Political Disconnection

Political disconnection refers to the disconnection between reforms and the broader governance and political structures that underpin the order of the Chinese education system. It also refers to disagreements over the political rationale and ideology behind such reforms. Political disconnection can occur at both a macrolevel—within the central government—and a microlevel—within the school (Walker & Wang, 2011). The following are some questions pertaining to political disconnection:

- Do the various reforms disturb existing power structures in schools? If so, then why?
- Do the reforms disempower schools while empowering the centre?
- Does the opposite situation apply? If so, can existing power structures adapt to the new reforms?

One example of this political disconnection is the debate over the new “merit pay” system. In 2009, the central government initiated a new income scheme that affected all public primary and junior secondary school teachers—those responsible for delivering the 9 years of compulsory education—known as the “merit pay” reform (The State Council, 2008). Under this new scheme, teachers' income increased by between 30 and 50%; however, the reform did not include post-compulsory education teachers such as those working in senior secondary schools and higher educational institutions. In effect, this meant that the government paid some primary and junior

secondary teachers more than their senior secondary colleagues in what was described as a “reverse income gap.” Given that the norm in China has always been for teachers working in higher level/status institutions to receive better pay than those working in lower level institutions, this reform caused real problems. This income gap disturbed the harmonious atmosphere in many schools, particularly in “middle schools” (*zhongxue*), which provide both junior and senior secondary education. In some areas such as *Xuzhou* in *Jiangsu* province, senior secondary school teachers refused to teach in protest at the policy (China News, 2010b).

Reforms such as the “merit pay” reform face implementation difficulties because they challenge much of the political structure underlying current systems. Although this may not necessarily be a bad thing, it does appear to interfere with the efficacy of reform implementation. Greater political connection is necessary, particularly at the broader level, if reforms are to make a difference. Political disconnection can be addressed through greater consultation, better communication, and the clarification or differentiation of broader values.

Cultural Disconnection

Cultural disconnection refers to disconnection between what reforms demand and the cultural realities of leading and teaching in schools. Reformers must ask themselves if their programs are congruent with the broader culture of China and with the deep teaching and leadership structures and values guiding relationships and behavior in Chinese schools. Although obviously connected, cultural disconnection differs from instrumental disconnection in that it focuses on values and ingrained understandings and behaviors rather than on the more overt structural features of schools. Questions include:

- Are specific reforms and their components appropriate given the unique culture and context of China’s educational institutions?
- Are the key thrusts of the reforms culturally appropriate on a broader level?

In a typical Chinese classroom, all students follow the same timetable under the protective purview of a head class teacher (homeroom teacher, *ban zhuren*). A commonly used metaphor for schools and classes in China is that of a family—the principal is the teachers’ parent, and each class is like a smaller family in which the head class teacher plays a parental role. In many cases, once students have been admitted into a primary school, they are supposed to have the same group of classmates and the same head class teacher for the next 6 years (or 3 years for junior and senior secondary schools). As in a family, a parent protects the children, who in turn rely on and respect the parent. Head class teachers take care of their students’ academic, moral, and psychological growth and discipline them when necessary to maintain control. Students, in turn, are more afraid of their head class teacher than they are of other subject teachers. Resonating with the traditional cultural tones of respect for authority and hierarchy, this class structure aligns with the Chinese emphasis on examinations—an emphasis that reflects the belief that the best way to maximize exam performance is for students to sit in the same classroom all day learning the content required to do well in the exams. As a result, few schools attempt to challenge this traditional structure.

This structure is so deeply rooted within Chinese schools that many attempts to challenge it have been met with strident opposition. For example, one senior secondary school principal in Shenzhen initiated a structural change in his school by introducing *zouke*, which literally means “walking classes.” Students could select their curriculum content and schedule and take different courses in different classrooms rather than all staying in one classroom learning the same content at the same time. The principal also introduced a new appraisal/reward scheme whereby students appraised teachers’ performance (Zhang, 2009). By doing so, the principal risked disconnecting the school structure from the China’s broader cultural reality.

As it turned out, this structural change achieved minimal success. Although most students welcomed the change and were grateful for the opportunity to develop their personal interests, most teachers adopted a stance of passive resistance and sought to block the reforms. They objected to the new arrangements because the changes reduced teachers’ direct control. Denied the opportunity to act as head class teachers, many instructors lost part of the parent–child attachment they had previously shared with their students. Teachers also experienced a reduced sense of authority given that they no longer taught the same group of students all of the time. Given these factors, implementation of the reform was “hot on two ends (principal and students) but cold in the middle (teachers)” (Zhang, 2009). Due to the teachers’ resistance, the principal finally left the school after 6 hard years of pushing the reform. A new principal followed and returned the school to the “normal” class teacher setting.

Cultural disconnection interacts with other disconnections to impede the successful implementation of reforms. The problem is that when firmly entrenched values and beliefs mix with hastily introduced and sometimes contradictory reforms for which the ground has not been adequately prepared, those values and beliefs tend to become intractable and difficult to change. When such values run counter to the direction of new reforms, they can form very powerful barriers to implementation.

Communicative Disconnection

Communicative disconnection refers to deficiencies in *how* reforms and their outcomes are explained, communicated, and sold within and outside the education community. Given the increasing accessibility of various forms of media in China, the reforms themselves and their apparent lack of success are inevitably communicated far and wide. Questions on this topic include:

- Have central, provincial, municipal, and district authorities clearly communicated the purposes of the reforms and progress made in their implementation?
- Has the press accurately transmitted information about the reforms and their success or lack thereof?
- Have principals communicated clearly enough with their school communities?

Communicative disconnection has both professional and public aspects. On the professional side, frontline practitioners believe the consultation process undertaken before the framing of reforms discussed in this article was inadequate and that this criticism remains valid in the context of their ongoing implementation. Much of the intellectual and instrumental disconnection issues

may be attributed to this lack of consultation. At a more basic level, practitioners do not feel that information ranging from justifications to details has been adequately communicated directly to schools. Again, a look at the new curriculum reform illustrates two levels at which communicative disconnection has arisen.

The curriculum reform initially implemented among senior secondary schools was first piloted in September 2004 in four provinces and regions: Shandong, Guangdong, Hainan, and Ningxia. Research conducted in Guangdong province (e.g., Yin, 2006; Zhang, 2008) showed that teachers were rarely consulted and were ill-prepared for the arrival of change. They knew they were supposed to have a new syllabus and textbooks by the beginning of the autumn semester but were not provided with any relevant training until the summer before they were due to start teaching the new curriculum. During these training programs, the basic message conveyed to teachers was that examination-centered teaching was “out of date” and did not conform to the requirements of the new curriculum (Yin, 2006). The new curriculum was aimed at encouraging new teaching methods, challenging the ingrained examination culture, and promoting holistic student development.

Teachers began to embrace the changes as a result of the training they received (Yin, 2006). However, when the new semester started, they became disillusioned for two main reasons. First, they found that they were inadequately prepared to implement the new curriculum. Second, examinations were not reformed as expected, often because local education officials communicated ambiguous messages about what was really important. As the reforms progressed, the messages became less ambiguous. Teachers soon learned that the importance of examinations, rather than an emphasis on new teaching methods and holistic development, remained the dominant message in local education officials’ speeches (Zhang, 2008). Many teachers became disappointed and chose to live with the reality that the focus on exams was unlikely to shift, and participated in what amounted to an informal “conspiracy” where the school had “two faces.” One face publically advocated in favor of the new curriculum, whereas the other face—the “working face”—continued to focus on exam results (Yin, 2006). In leading this double life, many teachers experienced deep emotional turmoil and inner conflict (Jin & Yin, 2008; Yin & Lee, 2008).

Teachers also suffered additional stress when the media were involved. There were, for example, constant media reports (e.g., *Shanghai Evening News*; *People’s Daily*) about schools adopting a “yin-yang timetable.” The media told stories of schools preparing two sets of timetables: the *yang* (open and public) timetable full of courses such as inquiry-based learning, music, and physical education intended for external consumption and the *yin* (unpublicized) timetable schools actually followed—one dominated by examination courses. These news reports were often critical of schools and accused teachers of being “stumbling blocks” preventing the implementation of quality education. The extensive dissemination of such views generated widespread societal criticism of schools and teachers.

Communicative disconnection has also contributed to increasingly negative public perceptions, not just of individual reforms but also of teachers and Chinese schools themselves. Negative widespread public perception persists, voicing concerns that the reforms, despite all of the money pumped into them, have made little real difference in schools. What is required for education reform to move toward success is greater understanding on the part of the public, the education community, and a more balanced press—sources of support that are unavoidably intertwined and depend on the establishment and maintenance of workable dissemination and two-way communication networks and mechanisms. In sum, communicative disconnection through the

media highlights other forms of disconnection by spreading inaccurate or sensationalized accounts of reform inadequacies and misunderstandings.

CONNECTION CHALLENGES

Recent education reforms implemented in China have focused on school management and governance, teaching and learning improvement, school leadership and teacher enhancement, broadening access to education, and building flexible pathways for teacher professional development. Policymakers have targeted such reforms at issues of increased decentralization, ever-rising standards, increasing accountability, and building the professionalism of the education workforce. These multiple targets have combined to form a crowded educational reform environment, which has yet to see a major or widespread success. Although implementation problems stem from disconnections at all stages of the policy process, change is not impossible. The challenge to educators regardless of their level and place in the system is to confront and address these disconnections. This is not the job of the central bureaucracy alone: School educators also have a responsibility to contribute actively from a school perspective as only they can. This may require that educators voice their views in a more forthright manner and reclaim their place on the reform agenda.

The purpose of this article was to identify some of the key challenges impacting the successful implementation of education reform in China. A framework made up of a series of interconnected disconnections guided this exploration. Policymakers need to address the aforementioned challenges before reforms can be deemed successful. Addressing the challenges involves the pursuit of closer and more meaningful connections across a number of facets. Although discussed separately in this article, the “connection” challenges facing policymakers and the wider education community are tightly interwoven. It is beyond the scope of this article to suggest solutions; rather, we put forward a set of questions to help rethink the connection issues before forming new policies:

- How should policymakers connect the structural realities of school life for students, teachers, and principals? Is there a need to stop, think about, and consolidate current reforms before introducing any new initiatives?
- How should the multitude of reforms be interrelated so they link with, support, and reinforce one another rather than appear to be independent, if not contradictory and competing, entities?
- How can the reforms connect with the current political realities of the Chinese mainland system?
- How should the reforms tie to the dominant cultural values, beliefs, and norms underpinning life in Chinese society and her schools? Have policymakers considered carefully enough how “imported” reforms fit the local culture?
- How can the meaning, purpose, and details of the reforms link to educator and public perceptions? Is more consultation with members of the educational community necessary before and during implementation?

Issues of disconnection have led many within the educational community to become cynical about the “real” effects of educational reforms. Despite the noble purpose of many reforms, such cynicism, if left unchecked, has the potential to further damage the efficacy and influence

of reforms where they are intended to make a difference: at the school and classroom levels. Due consideration of the factors involved in reform implementation—expressed in this article as a series of disconnections—will lead to more positive and effective changes in the quality of education in China.

We hope that the insights contained within this article encourage Chinese researchers to perform additional empirical research about questions such as “Why are there different forms of disconnections,” “What are the historical and institutional roots of the disconnections,” and “How have the patterns of different forms of disconnections changed over time?” Equally, researchers from other societies can apply a similar framework to investigate reform implementation in their contexts, at either a system or a school level. Research in different contexts, when brought together, may result in an enhanced understanding of international educational reforms.

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Principal Professional Development in China: Challenges, Opportunities, and Strategies

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This article examines the essential role of school principals in China's "Quality-Oriented Education" national reform movement. Keeping China's cultural and historical context in mind, and taking into consideration the impact of political and societal forces on the nation, we discuss the major challenges faced by Chinese schools, specifically the rising demand for a new generation of school leaders. To address this issue we conduct a critical review of the existing principal evaluation and training systems in China. From this data we then propose a framework of strategic directions for systemic professional development for school leaders.

INTRODUCTION

China has gone through momentous economic and political changes in recent decades. Today, new technology, international trade, political changes, consolidation of industries, privatization, and demographic changes—forces that affect the socioeconomic landscape in countries worldwide—are also keenly felt in the land of more than 1 billion people. Along with significant shifts in governance structure, financing schemes, and accountability policies, impressive development has also taken place in education, especially in the implementation of 9-year compulsory education, the drastic reduction of illiteracy, and the enhancement of higher education and vocational training. Meanwhile, societal mandates pertaining to the quality of education have been elevated and graduates of the school system are facing an increasingly complex labor market in need of knowledgeable workers who are creative and adaptive.

The primary focus of educational development in China has undergone subtle but important changes over the last two decades. Education now must serve the overall needs of economic and social development as well as promote equity, justice, and a harmonious society (Zhou, 2004). In 1993 the Central Committee of the Communist Party of China and the State Council jointly issued the *Guidelines for the Reform and Development of Education in China*, clarifying the directions and basic policies for Basic Education through the early years of the 21st century (State

Council of the Chinese Central Government, 1993). In June 1999, the Communist Party of China Central Committee and the State Council jointly promulgated the *Decision on the Deepening of Educational Reform and the Full Promotion of Quality-Oriented Education*, further clarifying what it claimed as the direction for the establishment of “a vital socialistic education with Chinese characteristics” (State Council of the Chinese Central Government, 1999) in the 21st century.

Quality-Oriented Education—*su zhi jiao yu*—became the hallmark of the nationwide educational reform in 1999 and was fully enacted in 2001 (State Council of the Chinese Central Government, 1999, 2001a, 2001b). Quality-Oriented Education provides a blueprint for promoting holistic student development both academically and socially (Gu, 2010).¹ Representing a systemic change that involves the transformation of virtually every step of the current educational process, Quality-Oriented Education is being implemented in every segment and every level of the nation’s educational system. China’s 350,000 elementary and secondary schools stand at a transformational crossroad, both in terms of school management and the key elements the schooling process.

Educational leadership, which stands at the center of this educational reform, has received significant attention from policymakers and educational administration scholars (Chu, 2003; Huang, 2004). The role of a school principal in particular has been a key focal point of both discussion and research, especially with regards to principal professional development that seeks to cultivate newer and stronger leadership.

In this article, we ask, What are the major challenges faced by Chinese schools and their principals? What are the implications of national reform mandates on developing a new generation of school principals in China? What strategic actions should take place to develop these school principals?

CHALLENGES FACING CHINESE SCHOOLS AND THEIR PRINCIPALS

We begin by examining the challenges principals face in a changing public policy landscape. Connecting the macrolevel reform initiatives to local-level stakeholders, we review the new imperatives for Chinese education and discuss how they affect principalship in four important aspects. The first two aspects address the interpretive challenges inherent to the *intention* of the Quality-Oriented Education policy’s new dual-mission—redefine quality and pursue equity. The second two aspects address the challenges inherent to the *enactment* of the Quality-Oriented Education policy through two major measures—curriculum reform and governance reform.

Redefining Education Quality

Despite the impressive economic development of recent decades, Chinese concerns over the consequences of the nation’s tightly controlled and test-based education system, which prepares students for success on exams but does little to encourage creativity, problem-solving skills, and other important qualities, continue to grow. Recent comparative studies between U.S. and

¹Although the officially coined English translation for *su zhi jiao yu* is “quality-oriented education,” it may be better interpreted as “well-rounded education.”

Chinese math learning and teaching found that although Chinese students were stronger than U.S. students in abstract mathematics reasoning and representation, Chinese students did not show stronger performance in graphing, using tables, and open-process problem solving (Cai, 2000; Wang & Lin, 2005). The growing economy and increasing diversification of society demand more graduates that are well-rounded citizens, equipped with not only book knowledge but also moral values, creative mind-sets, healthy minds and bodies, and versatile interests. Gradually, the overwhelming emphasis on standardized testing to promote academic achievement has begun to give ground to the desire for “*su zhi*”—quality.

It is important to find the construct equivalence of the Chinese word *su zhi* to fully comprehend the intent of the national reform. Although it can be broadly translated as “qualities” or “traits,” it covers the domain of well-rounded development in four main areas: morality (*de*), intellect (*zhi*), physical health (*ti*), and artistic attainment (*mei*). It is the “philosophy of putting people first and pursuing overall, harmonious and sustainable development and the strategy of revitalizing China through human resource development,” according to the Ministry of Education website (Zhou, 2004). Although the conception of these four domains for quality is not new, the Quality-Oriented Education reform, which was fully enacted in 2001, now mandates the actual implementation of changes in schools and classrooms nationwide.

The new mission promotes a student-centered and learner-centered agenda. At least in its intention, it takes the purpose of education further. Although still very much connected to political ideology and economic development, the Quality-Oriented Education reform elevates the intrinsic value of education. The new mission no longer measures educational success only by academic achievement—that is, by test scores. Human development and contribution to social cohesion and harmony are now included as dimensions that define “quality.”

Schools and their principals face multiple challenges in redefining learning priorities to achieve these new policy imperatives. First, the external accountability measures for school performance and student success remain largely unchanged. Given the enormous complexity and potential trade-offs of reforming the nation’s examination system, schools are under societal and parental pressure to continue preparing students for standardized and norm-referenced tests (Yao & Zhang, 2010; X. Zhang & Cravens, 2011). Throughout compulsory education, students are required to take end-of-term examinations to be promoted to the next grade level. Although junior secondary education has been basically universalized, those graduates from junior secondary schools seeking to continue their education in senior secondary schools have to sit for and pass locally organized entrance examinations before admission. In addition, college admission is based on a national entrance examination. Table 1 shows that in school year 2006–2007, only about two out of three (66%) of the students advanced to high school and only 23% of those who graduated were admitted into postsecondary institutions (National Center for Education Development Research, 2008). In a society where the advancement to postsecondary education and the type of institution greatly affect social upward mobility, the intense competition and grave consequences for failure put an immense pressure on all parties involved—students, parents, teachers, and schools.

Principals, who have become comfortable with the older achievement goals, may lack a true understanding of the humanistic core of the new mission and cast doubt on the realistic value of the purpose. Such school-wide reform requires the school leadership to delegate authority and build teams, to establish a flexible structure, to open communication channels, and to internalize motivations (Bai, 2006). Most principals have found themselves ill-prepared to navigate a

TABLE 1
Schools, Teachers, and Students at All Levels of Education in China (as of 2007)

	No. of Schools	No. of Teaching Staff	No. of Students	Rate of Enrollment
Higher education	2,321.00	1,248,473.00	25,285,551.00	23.0%
Upper secondary	31,140.00	2,279,620.00	44,811,583.00	66.0%
Lower secondary	59,384.00	3,472,995.00	57,361,947.00	98.0%
Primary	320,061.00	5,612,563.00	105,640,027.00	99.5%
Preschool	129,000.00	827,000.00	23,488,300.00	44.6%
Total	541,906.00	13,440,651.00	256,587,408.00	

Note. Source: National Center for Education Development Research (2008).

school-wide transformation of strategic planning, curriculum, instruction, teacher development, performance review, and other key components of school management (Chu & Fu, 2011).

Pursuing Educational Equity

Economic development in recent years has also brought intensified social stratification and increased friction among groups of different socioeconomic and ethnic backgrounds. The national quality-oriented reform highlights achieving equity in both access and quality of education as the key to constructing a more cohesive and stable society. Modern Chinese school financing and structure, however, present an immense challenge to carrying out the policy objectives both nationally and locally.

Based on county-level data first reported in 1997 and 1999, Mun C. Tsang and Yanqing Ding (2005) studied resource utilization and disparities in compulsory education in China. Their study found that although the pattern of resource utilization was similar across different areas of the country, there were substantial disparities in the level of per-student spending across these areas. A more recent study by Chengfang Liu and colleagues (2009) on high school education in China using secondary statistics found that educational access at the high school level was quite low, especially in poorer areas of rural China (Figure 1). The study found preliminary evidence that the low level of access to high school education might be a problem resulting from high tuition and fees. The authors further demonstrated that not only was high school a financial burden for the families of poor students but also there was little to no financial aid available.

Recent national studies on educational efficiency and equity have found consistent evidence that significant regional disparities exist in terms of resource allocation, teacher quality, and access to schooling for transient populations (Center for Educational Policy Analysis, 2007; Du & Shen, 2010; Tao & Yuan, 2010). Regional disparities among the three geo-economic regions—Eastern (costal), Central, and Western—are evident by comparing administrative and instructional expenditures, where on average the more developed Eastern region has a 2:1 advantage in per-pupil expenditure when compared with the less developed Western region (Center for Educational Policy Analysis, 2007). National data also show that in 2007 only 41.4% of rural middle school teachers (seventh to ninth grades) held bachelor’s degrees, and 63.4% of rural elementary school

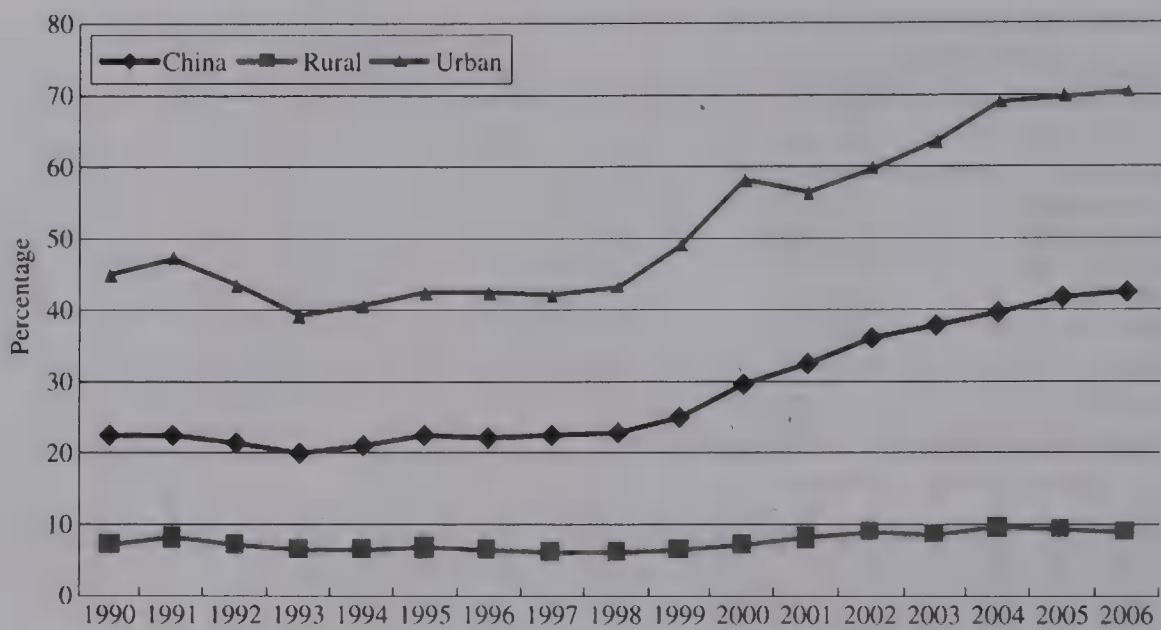


FIGURE 1 Promotion rate between academic junior high school to academic high school, by region, 1990–2006. *Note.* Source: China Statistical Yearbook (various years), calculated by authors (Liu et al., 2009) (color figure available online).

teachers had just 2 years or more of postsecondary education. These qualification averages are 30% and 22% lower than those urban regions (Tao & Yuan, 2010).

Inequity in resource allocation and teacher quality can also be traced within local education systems. For decades, Chinese students in middle school and high school have been placed in different schools and classes largely based on standardized test results. High-performing students are often assigned to key schools. These schools are broken into key classes and regular classes, which are sorted by student achievement in course subjects. Key schools and key classes often also receive more resources by contributing to the reputation of local governments, schools, principals, and teachers. Slow-track classes are often more or less ignored, whereas fast-track classes are further enhanced due to the unequal distribution of teaching and learning resources. Technically, the Compulsory Education Law of 2006 has eliminated key schools and key classes, especially during the 9-year period of compulsory basic education. Many schools, however, still practice ability tracking, albeit often under clever disguises, to achieve collective efficiency in light of the exorbitant size of student populations, limited funding resources, and achievement-centered outcome measures (Center for Educational Policy Analysis, 2007).

Given the perception that educational equity is a public policy concern, and its safeguard largely lies with external funding and accountability entities, what role can school principals play in advocating for equity in the access and quality of all students' education? We posit that principals should be moral leaders who make the conscientious decision to promote equity *within* schools and *between* schools. By exercising their judgment and leadership skills, principals may work with their leadership teams and teachers to provide support for students with disadvantaged backgrounds. High-performing schools with abundant resources and strong teacher expertise may form partnerships with low-performing schools in low-income neighborhoods to build instructional capacity. The city of Shanghai serves as an example of how cross-school collaborations

led by principals and their instructional teams can help to close achievement gaps and achieve high, citywide performance in reading, mathematics, and science literacy on the 2009 Program for International Student Assessment (OECD, 2010). A majority of the local school systems and their school principals in less developed rural areas, especially those in the Central and Western regions, have limited financial means, however, and lack the expertise to implement system-wide educational quality improvement while also addressing issues of educational inequity (Si, 2009; Zhu, Ruan, & Liu, 2010).

Implementing Curriculum Reform

One of the pervasive challenges inherent to educational reform is connecting policy intentions with implementation strategies (Hirosato, 2001; Kim, 2006; Ng, 2006). The enactment of Quality-Oriented Education largely depends on curriculum reform as its cornerstone. Specifically, learner-centered educational philosophy and individualized approaches take center stage. Teaching and learning goals that emphasize values and ethics, creativity and independent problem solving, and citizenship building were initially incorporated into the *15-Year Strategic Plan for Education* by the Chinese National People's Congress (State Council of the Chinese Central Government, 2001a), which was then revisited and confirmed in the *Educational Reform Plan* by the Ministry of Education in 2005. From 2005 onward, a new curriculum has been implemented for all new students in lower secondary schools. Some features of the new curricula for general secondary education are as follows: more relevant to real-life context, more practical hands-on experiences, more project-based inquiry learning, "white space" for local and school-based curricula, and more choices for students (optional modules). Changes are even being made to the grading system at all educational levels, taking into consideration students' physical and mental health as well as their comprehensive development.

The holistic approach for student development is exceedingly difficult to learn, implement, and assess, however. The new priority has brought on important changes to teacher preparation programs, curriculum structure and content, and instructional methods. Changes in pedagogy must be made from a teacher-centered approach to a student-centered approach, from direct knowledge delivery to fostering students' creative competence, from acknowledging the commonalities of students to encouraging the individualities of students, and from a rigid and examination-oriented type of assessment to a formative and "value-added" assessment system. Educators, however, have been pressed to provide visible and exciting results without systemic support and competency-building training. Moreover, many Chinese schools, especially those in urban areas, have large class sizes, making differentiated instruction all the more challenging. Figure 2 compares country-level averages of class size, noting that the Chinese upper secondary schools has the highest average at 56.6 students per class (National Center for Education Development Research, 2008).

This means that many school principals are, for the first time, acting as instructional leaders. They must now lead efforts to design and evaluate new curriculum content, spend time observing and monitoring classroom activities, and work with their teachers to improve instructional practices. Such transformation is slow, and principals are often caught between the existing testing system that measures school performance in terms of *achievement* and the enacted accountability scheme that calls for enhanced student *ability* in both social and academic settings.

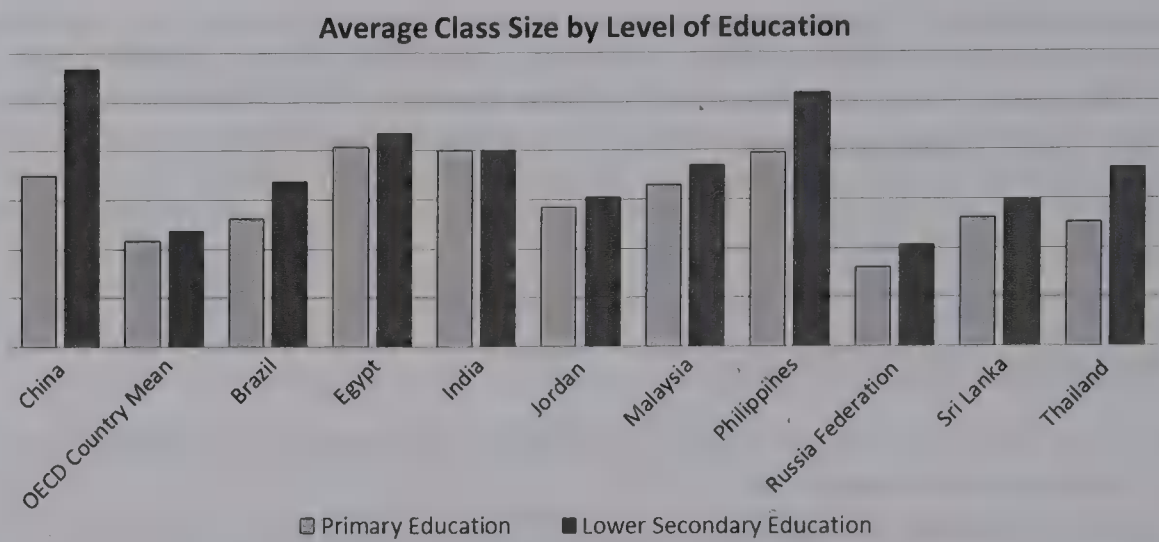


FIGURE 2 Average class size comparison (National Center for Education Development Research, 2008) (color figure available online).

Research repeatedly identifies instructional leadership as the most important factor propelling school improvement (Hallinger & Murphy, 1985; Heck, Larsen, & Marcoulides, 1990; Leithwood, Louis, Anderson, & Wahlstrom, 2004). Chinese scholars have found that the instructional leadership model is particularly meaningful in helping principals focus on student learning, teacher professional development, and the self-development of the principal (Bai, 2006; Z. Zhang, 2005). The core for this strand of leadership includes the ability of leaders to (a) stay consistently focused on the right stuff—the core technology of schooling, or learning, teaching, curriculum, and assessment, and (b) make all the other dimensions of schooling (e.g., administration, organization, finance) work in the service of a more robust core technology and improved student learning (Knapp, Copland, & Talbert, 2003). The challenge, however, is for Chinese school principals to learn how to lead by working with the teachers to optimize curriculum structures and processes, and to provide academic support for all students.

Experimenting With Governance Reform

With schools in China becoming more decentralized, market oriented, and diversified, principals are facing more accountability demands from local governments and communities. A decentralized school system requires principals to have strong leadership and problem-solving skills to guide them in making a broad range of decisions. Previous research on school reform indicates that transformation puts the spotlight on organizational processes (e.g., supporting staff) and employing effective methods to make the school and its members (staff, students, families, community agents) more productive (Leithwood & Jantzi, 2005; Marzano, Waters, & McNulty, 2005). In today’s China, principals have increased responsibility for the long-term development of their schools. Used to relying on top-down directives and day-to-day management routines instead of proactive and localized strategies—a habitual practice from time spent in the centralized management system—many principals find it difficult to plan and manage both strategically

and independently (Huang, 2004; Li, 2004). In fact, administratively, school principals once received government civil service rankings. Their appointments, responsibilities, promotion, and evaluations were based on rules similar to other government officials (Huang, 2004).

In 2004, the Ministry of Education issued the *2003–2007 Action Plan for Invigorating Education*, which urged for the transformation of government functions, the strengthening of the compliance of rules and regulations, and establishment of the public education administration and service system. Also, it urged local systems to standardize the educational administrative departments' functions in policy making, macro-control, guidance and supervision, coordination of education administrative departments, and protection of school-level autonomy.

Decentralization is a global trend that aims at stimulating competition; attracting diversified funding; and, more important, encouraging innovation and customer-centered services with local autonomy and ownership (Astiz, Wiseman, & Baker, 2002; Bray, 1999). Educational reforms have also embraced decentralization in the form of school-based management, which has become more prevalent in the Asia-Pacific Region (Cheng, 2002; Chu, 2007). Empowered and capable local-level management, however, is far from reality in most Chinese schools. Locally empowered governance calls for three important management principles, which present new challenges to school principals.

The first principle, *scientific school management*, centers on disciplined approaches for planning, implementation, monitoring, and evaluation based on facts and evidences rather than assumptions and ideals (Goldring & Berends, 2009). Data-based decision making requires principals to collect and utilize various sources of information to develop a culture of learning for both teachers and students. Schools face significant barriers to the implementation of this principle—whereas the new mission of Quality-Oriented Education has redefined student-learning outcomes, the educational system and society are still in the midst of identifying multifaceted measures for school effectiveness. Furthermore, collecting data for school improvement and student learning is a demanding task that requires not only staff time but also expertise. Resources and training for personnel are lacking in most school districts, whereas existing local school evaluation mechanisms are inadequate and provide little constructive feedback for schools. The lack of principal skills and experience in collecting, analyzing, and utilizing data also hampers school-based data decision making (Chu, 2009).

The second principle, *democratic school management*, provides the foundation and assurance for scientific school. What happens in the educational system reflects the pursuit for political democracy in the society at large. In essence, education about democracy and the democratic practice forms the foundation for political democracy. Rather than relying on bureaucracy, schools need leaders that can build professional learning organizations that consciously and continuously pursue wider participation and collaboration. New types of relationships among students, teachers, and principals will need to be established based on shared vision and the fostering of innovation and improvement. Despite progresses, transparency in school management and distribution of leadership are still lacking in many schools in the nation. The deficiencies are particularly prevalent in the lack of an accountability structure that ensures public scrutiny of school management and the lack of participation in decision making among stakeholders such as teachers, parents, and students (Chu, 2009).

Furthermore, distributed leadership (Spillane, 2006) is a relatively new concept distinct from the traditional hierarchical structure of China (Chen, 2006). If teachers actively participate in curriculum design and instructional improvement, the limited resources that a school receives

can be extended and enriched. However, because school context varies greatly, implementing the distributed leadership model requires the principals to master locally driven strategies. A 2005 teacher survey found that teachers in schools with lower levels of student achievement tended to perceive their principals with concentrated administrative authority but fewer responsibilities, as compared with the perception of their teacher counterparts at key schools or schools with higher achievement levels who reported more distributed decision-making practices (Chu & Yao, 2005). The same survey also studied participation in decision making as another key indicator for distributed leadership. Among the 960 teachers who responded to the survey regarding school management in the districts of Beijing Municipal Area, 79.5% expressed the desire to be included in the decision making. When asked to rate the number of opportunities given to participate in deciding important school matters, however, fewer than 40% answered “many” or “some,” and the majority of teachers responded that they had few or very few opportunities.

The third principle, *legalistic school management*, requires the principal to put rules of law above all personal subjectivity. Scientific and democratic school management is not possible without the systemic support of well-established and strictly enforced educational laws and regulations. China’s long history of highly centralized governance structure, where well-established management transparency was lacking, undermined such laws and regulations, making the morality of the leader in power the only hope for equality and fairness (Gao, Wang, & Lin, 2006). As such, effective management largely relies upon the ethics and intrinsic values of those individuals in power (W. Lin, Chen, & Wang, 1987). However, as China’s government gradually establishes and reinforces laws and regulations for the education system, the reliance on personal virtues for school leadership must be accompanied by clear and coherent rules (Chu & Fu, 2011). In a 2004 proclamation advocating for the full implementation of reform, the minister of Ministry of Education emphasized that

the first important measure is to strengthen systematical innovation and to manage education by law. This includes the perfection of legal systems for education, the implementation of the Law of Administrative Approval, the adoption of practical approaches to change the function of educational authorities, the reinforcement of supervision and evaluation, and development of management system reform as well as the reform of internal management system within education institutions. (Zhou, 2004)

Chinese schools and their principals therefore need systemic support to reinforce the objectivity, stability, and fairness of the management system.

NEEDS AND OPPORTUNITIES OF PRINCIPAL DEVELOPMENT

In China, the new mission of Quality-Oriented Education greatly expands the purpose of education. The role of education in society, therefore, sets a very high threshold of necessary dispositions, knowledge, and skills for effective principalship. Professional development is vital to the fulfillment of this new mission. From the individual perspective, it is the path of conscious and continuous personal pursuit in professional growth; from the societal perspective, it is the key mechanism to systemically building an educational leadership force in response to new societal changes.

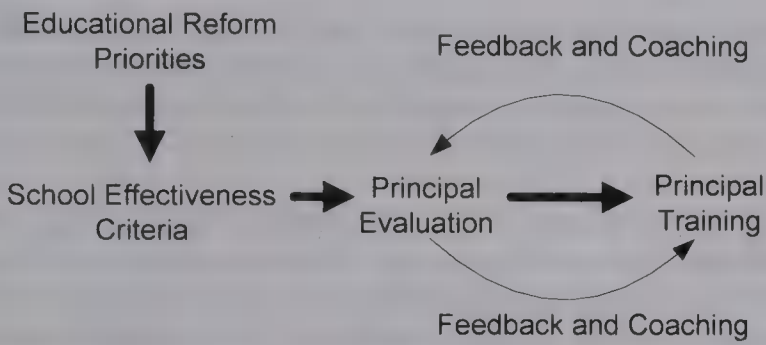


FIGURE 3 Systemic alignment for principal professional development.

Developing school principals is a historical and system-wide undertaking. Identifying the core functions of school principals, developing training strategies, and advocating for principal professionalization thus became a major reform initiative beginning in the 1990s (Chu, 2003; Huang, 2004; Li, 2004). The initiative named *Professional Development for One Million Principals* started the central government’s effort as a part of the national educational reform for Quality-Oriented Education. An advisory committee was established to provide guidance on policies and training programs for school principals’ nationwide (State Council of the Chinese Central Government, 1993). The *Basic Education Principal Training Guidelines* of 1999 was another important benchmark for the advancement of principal development (Ministry of Education, 2010). In recent decades, significant progress has been made in both the quantity and quality of development-related programs offered to school principals. However, the progress has not come fast enough, nor can it sufficiently meet the demands of schools and their principals (Chu, Lu, & Liu, 2009). Most pressing, today’s principal development for Chinese principals demands a coherent system that is built upon a sound leadership knowledgebase, providing a framework that ensures the alignment of all core components of reform implementation—including educational reform priorities, school effectiveness performance criteria, and professional development activities such as evaluation and training.

An illustration of such an alignment is shown in Figure 3. The first alignment is between the definitions of effective schools (core performance measures) and the overarching priorities of Quality-Oriented Education reform: Does the definition of a high-quality school reflect the reform objectives of well-rounded quality and equity? The second alignment is between school performance measures and the evaluation criteria of principal performance: How much can principal leadership contribute to achieving the school effectiveness defined by the reformed criteria? The principal evaluation should first and foremost serve a formative purpose to assess the professional development needs of the principal. The third alignment is between the evaluation and the principal development: What competencies must a principal equip to ensure that the school as a collective professional community works toward the goals of Quality-Oriented Education? Feedback and coaching are needed to provide ongoing and constructive support that turn performance information into actionable improvements. Moreover, ongoing principal evaluation should be designed to assess the added value of training and other relevant efforts.

Stipulations established in the 30 years after 1949, which marked the establishment of the People’s Republic of China, clearly indicated that the school principals’ main responsibility during that period was to follow the instructions of local government, which received its guidelines from

the central government in Beijing. Loyalty in implementing government and party policies was the key area of concern according to the stipulations. Standards and guidelines that were specific to principalship—such as the purpose and methods of managing schools, ensuring education quality, and developing working relationships with teachers, students and parents—were inadequately specified (Huang, 2004).

Today, China approaches principal development at two levels. In the aggregate, the occupation represents the collective and incremental effort of reaching eight objectives for professional recognition: (a) extensive specialized training, (b) solid knowledge system, (c) clear and widely accepted ethic code, (d) high practice standards, (e) rigorous qualification requirements, (f) professional autonomy, (g) relatively high social esteem and income level, and (h) established professional organizations. On the individual level, professional development can be interpreted as principals' efforts to gain professional knowledge, skills, and aspirations for continuous personal growth and career advancement. Both collective and individual efforts are indispensable, as individual professional development is the foundation for collective occupational progression toward professionalization.

Principal development, however, faces many challenges. Chief among them is the unique nature and the complexity of the work of a school principal. As a key player in every education system, the role of the school principal is fundamentally different than many other occupations, especially those with for-profit motives. Internationally, in promoting public education for the common good, countries share the vision that puts student learning and development as a top priority. For example, the 1996 Interstate School Leaders Licensure Consortium Standards for School Leaders and the newly updated 2008 version emphasize that school leaders' primary responsibility is to improve teaching and learning for all children (Council of Chief State School Officers, 1996, 2008). Interstate School Leaders Licensure Consortium's call for accentuating student learning and development has been echoed in the standards-setting policies of many countries (Guthrie & Wong, 2007).

Henceforth we shed light on the progress made and new strategic actions necessary for the core components of professional development in China today: school effectiveness criteria, principal evaluation, principal training, and feedback and coaching for principals.

School Effectiveness Criteria

To date, much of the intended reform policy for well-rounded quality and equity is yet to be fully implemented (Gu, 2010; Zhou, 2004). Test scores, especially college-entrance examination results, remain the main benchmarks for school performance. Recent comprehensive reviews of national school evaluation practices indicate the presence of a significant gap between reform imperatives and current practices at the local level (Center of National Assessment of Basic Education Quality [CNABEQ], 2009; Cravens, Chu, & Zhao, 2011).

To survey the landscape of reform implementation, the Chinese Ministry of Education launched a project named *School Evaluation in the Context of the Quality-Oriented Basic Education* in 2007. This project was headed by the CNABEQ with ministry-level policy makers, leading educational administration scholars from various institutions, and experts from the practice field of local schools. The goal of the project was to redefine the effectiveness criteria for the nation's public schools.

The project team put forth a draft of potential school effectiveness frameworks and core measures based on recent educational reform priorities (Table 2). In this matrix there are five core measures of school effectiveness. The first four are system-wide measures: student development, instruction and curriculum, teacher professional community, leadership, and management. The fifth is a flexible measure to be determined as a local priority. Each core measure is delineated by two more levels of specificity: dimensions to the core measure, and school-level indicators.

The new framework positions *student development* as the top priority and as the outcome measure in alignment with the purpose of the Quality-Oriented Education reform. With the implementation of the new framework, reformers no longer define student development just in terms of academic achievement. Other dimensions (or school-level indicators) such as attitudes, behaviors, artistic enrichment, and healthy life habits now also play a role. The following three—*instruction and curriculum*, *teacher professional community*, *leadership and management*—are considered process measures. Furthermore, the framework gives local school systems more flexibility to define their own goals, a necessary condition for school-based and site-based management. It also puts more emphasis on proactive measures as opposed to reactive ones. For example, the core indicator “leadership and management” contains new criteria on resource utilization—with increased commitment from the central government to ensure equitable distribution, how to maximize funding becomes more important than securing resources.

The school evaluation framework establishes a foundation for the iterative process of developing and perfecting the principal development system. First, school effectiveness criteria will inform the design of evaluation instruments and training curriculum for principal development. For all core measures and their subsequent components, each school-level indicator will be further operationalized into observable actions and measurable results to guide training and evaluation. Second, new and existing assessment of the mechanism and outcome of training models and evaluation instruments may in turn inform further alignment between core performance criteria and professional development activities.

Each step in this process will require a tremendous amount of theoretical research and field work. In fact, the field of educational leadership has yet to fully articulate the “criteria to define ‘high quality’ professional development and describe goals for professional development” (Goldring, Huff, Spillane, & Barnes, 2010). Key issues such as how professional development influences practice and how researchers will measure the effects of professional development are at the front and center of the leadership-building community agenda.

Principal Evaluation

An effective principal evaluation system is a key component of professionalization. Leadership assessment is gaining increasing attention as a significant part of systemic support in China. There has been little evidence, however, of using formative or summative assessments to effectively measure and develop leadership knowledge and skills (Zhao & Wang, 2007). In fact, the government has not made any specific stipulations regarding principal evaluation beyond an initial recommendation made by the Ministry of Education in 1992 entitled *Draft Opinions on Enhancing the Development of School Principals in the Nation*, in which the Ministry of Education proposed four dimensions of assessing principal effectiveness: values (*de*), abilities (*neng*), diligence (*qin*), and achievement (*ji*; Zhao & Wang, 2007). These four dimensions have

TABLE 2
Quality-Oriented Education Evaluation Framework and Indicators

Core Performance Measures A Level (I)	Components To Core Measure B Level (II)	School-Level Indicators C Level (III)
A1 – Student Development	Physical and Mental Development	Physical Health Health Awareness and Habits Emotions and Attitudes Communication and Collaboration
	Moral Behavior	Values and Beliefs Behaviors and Habits
	Academic Performance	Academic Achievement Analytical Ability (above subjects) Artistic Attainment
	Life Skills	Life Skills for Independence Community Experience
		Coverage and Involvement
A2– Instruction and Curriculum	Moral Education	Format and Depth
	Curriculum	Curriculum Standard Alignment School-Based Curriculum
	Instruction	Instructional Methods Classroom Practice
A3 – Teacher Professional Community	Teacher Development	Teaching Ethics Instructional Research and Training Training of “Core” Teachers Training of “Homeroom” Teachers
	Teacher Assessment and Incentive	Teacher Assessment Teacher Incentive
	Teacher Performance	Teacher-Student Relations Professional Behavior Impact on Student Learning and Development
		Mission and Goals
		Strategy and Goals for Development Operational Integrity
		Departmental Responsibility
A4 – Leadership and Management	Leadership Team Building	Leadership Team Quality Leadership and Staff Relations
	Basic Management	Management Structure Safety and Discipline Support Functions
	School Culture	Campus Cohesion Classroom Team Building Support for Special Needs Students
	Resource Development and Utilization	Financial Management Facility Management
		Resource Development
		(Locally determined)
		(Locally determined)
A5 – Local Flexible Measure	(Locally determined)	(Locally determined)

Note. Source: CNABEQ (2009).

since been used at provincial, city, and township levels as the guidelines for principal evaluations. However, the extent to which such dimensions are covered and the formats used varies greatly from region to region.

Beyond China, there is a dearth of research literature about the international evaluation of principals. Because of the complexity of the principal's role, the main difficulty in the field of school principal leadership assessment is identifying the leadership dimensions that should be assessed (Glasman & Heck, 1992; Marcoulides, Larsen, & Heck, 1995; Oyinlade, 2006). Beyond the difficulties related to "what to assess" is the challenge of determining appropriate methods to establish the assessment process and to make valid inferences regarding principal performance (Goldring, Cravens, et al., 2009). In a review of leadership assessment in education, Portin, Feldman, and Knapp (2006) pointed out that the broad trend of increasing emphasis on learning and school improvement in recent decades has impacted which and how leaders are assessed. Five shifts, according to the review, have emerged as new directions for leadership assessment, including assessing behaviors instead of traits, relying on professional standards, focusing on learning results, emphasizing leadership development, and considering organizational context.

A recent review of existing national and local policies and practices highlighted inadequacies among both the standards for principal effectiveness and how such standards are operationalized by districts and schools (Zhao & Wang, 2007). The review pointed out that the effectiveness standards made no distinction between behaviors, results, or abilities of the principals when setting assessment criteria, thus causing inevitable confusion. The four aspects of school leadership recommended by the 1992 Ministry of Education document—values (*de*), abilities (*neng*), diligence (*qing*), and achievement (*ji*)—are good examples of the jumbled standards used when measuring principal performance.

In early 2009, the CNABEQ conducted a national inventory to collect baseline data on school evaluation practices, instrumentation, usage, and feedback mechanisms. The project team collected a national sample of school evaluation plans, and through a systemic approach they obtained a snapshot of school evaluation in China. A total of 207 school evaluation plans were identified for the study, and among them 155 were analyzed using a stratified random sampling method from all provinces and special districts in Mainland China. Initial findings showed that student development was the evaluation criterion with the most occurrences. Other core measures such as instruction, curriculum, and teacher professional community were covered in most of the evaluations as well, though these domains were not defined consistently or comprehensively enough to reflect the reform policies. The results of the analysis also indicated that the format and quality of evaluation instruments varied greatly and featured limited psychometric properties. Furthermore, there were notable regional differences between evaluation instruments. Although the more economically and academically advanced Eastern region appeared to focus more on instruction, curriculum, and teacher training—a stronger focus on quality—the Central and Western regions gave more emphases to school management of resources, facilities, and other necessary "hardware" (CNABEQ, 2009; Cravens et al., 2011).

Although principal evaluation research in China is in its infancy, it has garnered significant support from the Ministry of Education (Chu, 2003). An increasing number of pilot projects are beginning to take place in collaboration with city and district bureaus of education (Zhao, 2009). Looking into the future, the construction of a high-quality and successful evaluation program for school leaders should draw from theoretical and empirical research in leadership assessment but also install rigorous, cross-cultural validity and reliability checks along the way.

Principal Training

Principal training in China has gone through several stages of major revamping since the early 1990s in terms of process improvement and curriculum modification. The State Education Commission (renamed the Ministry of Education in 1998) issued a document titled *Strengthening the Training for Principals of Elementary and Secondary Schools Nationwide* in 1989 and then in 1995 introduced a second document titled *Training Direction for Principals of Elementary and Secondary Schools*. Principal training has since made much progress. Policies regarding principal training have been initiated by central and local governments, the academic and professional level of principal training has increased with the participation of universities in the development and delivery of training programs, and a growing number of school principals have begun to take part in training programs. Moreover, an increasing number of Chinese educational scholars now regard principal training as a viable field for theoretical and empirical research (Chu & Yang, 2009).

China currently features three types of principal training: induction training for school principal candidates, continuing training for principals who have a professional certificate for school principalship, and research training for those principals who not only have professional certification but have also demonstrated exemplary performance in their positions. The induction training offers basic knowledge and skills that are considered necessary for effective school leadership. The renewal training offers trainees a broad range of curricula in education and educational administration. The advanced training usually offers trainees selected topics for in-depth learning and research.

Administratively, the central government provides principal training at four different levels. The highest level applies only to those exemplary principals who have been selected nationwide for training as demonstrative leaders. Advanced training is thus the main focus. There are two such national training centers: National Training Center for Secondary School Principals in East China Normal University and the National Training Center for Primary School Principals in Beijing Normal University. Both training centers also incorporate best practices and field input into training policies, train-the-trainer practices, and curriculum design. The other three levels of principal training, which provide induction and renewal training, are provincial level for high school principals, which includes some advanced training for selected candidates; city level for junior high school principals; and district level for local primary school principals.

Despite significant strides, today's principal training programs in China are unable to meet the demands of the nation's reforming educational system. Nested in the existing public administration system, principal training is tied to the interplay of many complex factors, including training providers, funding sources, and personnel management. Some believe that changes to any of these factors could tip the balance between supply and demand, in the process impacting training quality (Chu & Yang, 2009). For example, locally run teacher colleges or teacher continuing education centers once provided principal training at the provincial, city, and district level but have now either merged with larger universities or been closed due to concerns over efficiency and funding shortage. A review of the principal training capacity building and reform initiative (Chu et al., 2009) found that from 1996 to 2001 the number of training centers at the district level shrank from 2,088 to 1,800 (a 14.8% reduction), and from 1996 to 2005 the number of provincial or city normal colleges for teacher training decreased from 240 to 80 (a 66.7% reduction).

Consequently, the local training capacity for teaching personnel, which includes principals, has been seriously hindered.

Studies of existing training programs have also found significant deficiencies. Programs content is often fragmented, lacks a theoretical and empirical foundation, and pays little attention to practice. Opportunities for training have also been unequally distributed among principals due to great regional differences in resources—large gaps exist between urban and rural areas and between developed and underdeveloped areas. Finally, the training staffs of many training institutions have been unable to keep up with the changing needs and rising expectations of the principals (Chu et al., 2009). Such deficiencies, if not addressed, could significantly hinder the development of school leadership for Quality-Oriented Education.

Feedback and Coaching

Recent field research on the state of school evaluation in China indicates that how well the evaluation process is carried out tends to be strongly associated with the perceived benefit of evaluation by school personnel (Chu & Yang, 2009; Zhao & Wang, 2007). In a 2004 qualitative study of principal evaluation within a large, Beijing school district, principals reported that the relevance and utility of evaluation systems were hindered by inadequacies in the credibility of the evaluators, the objectivity and timeliness of feedback, and the alignment of evaluation criteria with real consequences (Zhao & Wang, 2007).

Such school evaluations are most often conducted by dedicated personnel working for the local bureau of education. This particular administrative practice is usually called “supervision and evaluation” (*du dao*), which holds a largely monitoring function. The 2009 CNABEQ school evaluation inventory project also yielded important qualitative data on local capacity to perform school evaluations. Utilizing a stratified random sampling process that identified school districts in 22 counties or county-equivalent cities in eight provinces, researchers surveyed 102 supervision and evaluation offices at local bureaus of education. Receiving a response rate of 91.1%, the survey study found that although a majority of evaluators were experienced educators (10 or more years as school administrators or teachers), more than two thirds of the evaluators had been in the position for fewer than 3 years. Furthermore, training for the evaluator role lacked consistent funding and more important sound curriculum and qualified trainers to realign school evaluation with the new priorities of Quality-Oriented Education. Consequently, trained supervisors often considered “supervision and evaluation” more of an administrative ritual and a top-down summative judgment than a formative process to enhance the performance of a school and its principal (CNABEQ, 2009).

Similar to the findings of the 2009 CNABEQ study, international research literature reveals that principals rarely receive systematic, specific, constructive feedback that enables them to know whether their actions are consistent with their intentions or expectations. Furthermore, few principals receive systematic coaching on how to use feedback information (Haynes & Mavrogordato, 2009). Research shows that behavior changes most when individuals receive constructive feedback that can be compared to specific goals or standards. A discrepancy or dissonance between behavior and a standard of excellence increases an individual’s motivation to reduce the dissonance. The comparison between self-ratings and feedback from others can challenge behavioral patterns and provide the motivation to rethink a behavior and its impact

on others (McCauley & Moxley, 1996). Although the research based on the use of feedback for principal leadership development is scant, studies looking at the effect of 360-degree feedback in business settings report that leadership improves and leaders become more self-aware of their strengths and weaknesses (Hesketh et al., 2005; Reilly, Smither, & Vasilopoulos, 1996).

In the case of China, a feedback and coaching system can serve as the important conduit that connects the evaluation process with the professional development needs of the principal. Coaching has the potential to channel feedback in a productive manner. The evaluation process requires everyone involved to fully comprehend the new quality indicators; to know how performance indicators translate into day-to-day behaviors; and to be able to collect, compile, and analyze multiple sources of data from teachers, parents, students, and the community. Building the capacity of administrative personnel to be more informed and skilled participants of the evaluation process at the local level is of paramount importance.

More important, successful feedback and coaching is tied to a principal's ability to perform self-evaluation. Although establishing a strong external monitoring system is important, especially given the current need for development and improvement in Chinese schools, one of the most feasible and effective ways to provide formative assessment is for principals to practice vigilant and strategic self-examination of their schools' performance in the areas that matter—student development, instruction and pedagogy, teacher professional community, and leadership and management (Chu, 2009).

FUTURE STRATEGIES

Upon our critical review of the policy landscape of contemporary Chinese education and the essential role of school principals in the national reform for Quality-Oriented Education, we see that the major challenges faced by Chinese schools call for transformational and moral leadership toward the fulfillment of a new mission of education that promotes humanistic values of equity, integrity, and creativity. Moreover, these reforms call for instructional and distributed leadership where curriculum and governance reform measures can be implemented and sustained democratically, scientifically, and legally.

To meet the challenges presented by China's new mission for educational quality and equity, Chinese principals require a strong leadership competency-building model, which will allow leaders to apply existing and emerging leadership theories and models to the context of Chinese schools. We thus propose a conceptual model that may serve as the knowledge base for the construction and implementation of the new principal development system (Table 3).

Strategically, building a comprehensive principal training network challenges researchers and educators to reexamine existing efforts and to identify those elements essential to the system. With the new mission of the Quality-Oriented Education reform in mind and drawing from international literature on professional development (Goldring, Cravens, et al., 2009; Leithwood et al., 2004), we propose a set of key elements of principal professional development that are categorized into three main function areas.

Content focus: Training programs should (a) be designed to improve principal expertise and practices in transformational, moral, instructional, and distributed leadership; (b) employ field-based learning practices; and (c) encourage action research.

TABLE 3
Leadership Competency-Building Model

	Challenges	Leadership Demands	Leadership Training
Reform Priorities	Well-Rounded Quality	Transformational Leadership	Knowledge, skills, and practices that lead to enhanced performance in the Quality-Oriented Ed core measures
	Educational Equity	Moral Leadership	
Reform Enactment Measures	Curriculum Reform	Instructional Leadership	
	Governance Reform (Decentralization and School-Based Management)	Transformational Leadership Distributed Leadership	

Training methods: Training programs should (a) incorporate the use of reflective skills, (b) have a mentorship component where academic advisors and field experts work hand-in-hand to provide guidance and support, (c) value learner-centered approaches where the needs of each principal trainee can be assessed and provided with tailored training plans, and (d) use a cohort model to encourage peer-to-peer learning.

Assurance of equity and quality: Training programs should (a) be accessible to all school principals, especially to principals from economically disadvantaged areas; (b) be provided by qualified faculty and staff who have opportunities to regularly upgrade their own knowledge and skills; (c) implement regular certifying evaluations with training institutions; and (d) provide timely feedback and technical assistance for improvement.

Essential to this competency-building model is an unpacking of each type of leadership in the Chinese school context beyond just a label and definition. For example, although instructional leadership can be broadly understood at its face value, a more nuanced understanding must be established for it to guide the training and evaluation of principal development. We must ask: Does the theoretical definition differ from the understanding of school principals? Does the understanding differ among principals from different backgrounds? What are the necessary expertise (knowledge and skills) to be instructional leaders? How is such expertise exhibited in principal practices? And how should best practices be transformed into training activities?

Establishing leadership models that are congruent with the cultural and socioeconomic context of China requires theoretical and empirical research that can overcome conceptual and methodological challenges (Heck, 1996). To date, few of the leadership theories generated in the Western literature have been closely examined for their generalizability across cultures (Dimmock & Walker, 2000; Hallinger, Walker, & Bajunid, 2005). Although several recent comparative studies on the conception of instructional leadership (Sun, Youngs, & Zhao, 2010; Zhao, 2009) and learning-centered leadership (Cravens, 2008) shed light on the relevance and utility of leadership theories to principal development in China, much groundwork on this front remains to be done.

In summary, our assessment of the existing Chinese principal evaluation and training system demonstrates the need for a new framework for principal professional development that aligns with the priorities of Quality-Oriented Education. More important, it calls for the congruence among the core elements of professional development and the ongoing assessment of how each element informs and contributes to the professional growth of principals. The viability of a new

framework for principal professional development will be largely dependent on how the intended performance in student social and academic learning are defined and measured. There are still many obstacles to overcome: Principals are overwhelmed by the mounting day-to-day demands at schools where their time must be spent on issues such as fund-raising; dealing with student (and sometimes parental) mentalities associated with the "one-child" policy and the desire to achieve in a highly competitive environment; and capacity concerns over large class sizes, especially in urban areas and higher grades. Adding to the complexity, many of the Chinese educational reform mandates have yet to be implemented and cannot be fully achieved without significant changes to the current national examination system. Performance goals, which have been established based on professional standards that do not have systemic support, will be impossible for principals to reach, making the training and evaluation systems based on such standards meaningless or even potentially harmful to improved student learning.

It is foreseeable in 5 to 10 years that the establishment of sound performance measures for schools and principals will lead to valid and reliable principal evaluations that are aligned with the national educational reform imperatives. Such an assumption might serve as an excellent premise for new research inquiries that explore the relationship between enhanced principal development and the improvement of student learning over time.

As the most populous nation in the world, and home to the largest education system, China has more than 1 million principals and deputy principals as of 2006 (National Center for Education Development Research, 2008). The challenges facing these principals are daunting, but we hope that the opportunity to build a strong leadership capacity will prove invigorating. If the transformative measures in China's schools work effectively, the potential impact on the world's education systems will be profound.

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Cultivating an Environment That Contributes to Teaching and Learning in Schools: High School Principals' Actions

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Improving principal leadership is a vital component to the success of educational reform initiatives that seek to improve whole-school performance, as principal leadership often exercises positive but indirect effects on student learning. Because of the importance of principals within the field of school improvement, this article focuses on investigating the actions taken by principals working to cultivate an environment that contributes to effective teaching and learning. Utilizing data from 183 high school principals in Taiwan, this article finds that principals contribute to the healthy environment through personal, organizational, professional, and communal approaches. This article proposes that a respectful and caring learning community is the ideal environment for teaching and learning. This article also provides suggestions for principal leadership development that will help facilitate such an environment.

Principal leadership exercises positive but indirect effects on student learning (Cheng, 2003; Lin, 2009). Past research indicates that

the impact of educational leadership on student achievement is demonstrable. Leadership effects are mostly indirect, and they appear primarily to work through the organizational variable of school mission or goals and through variables related to classroom curriculum and instruction. (Leithwood & Riehl, 2005, p. 17)

Hallinger and Heck (1996) utilized the idea of “internal school processes” to explain the variables that lie in between principal leadership and student academic achievement (p. 770). In other words, it is mostly through school culture and capacity building, school restructuring, school human resources enhancement, and power and conflict resolution that the principal can impact teaching and learning (Hoy & Miskel, 2001; Lin, 2010). Recently, the ideas and practices of concepts like “professional learning [communities]” (Matthews & Crow, 2010, p. 46), caring learning communities (Sergiovanni, 1994), and learning organizations (Marsick & Watkins, 2005) have been employed to describe the dynamic environment that contributes to teaching and learning in schools. Further studies have focused on investigating ways principals can foster an environment that contributes to a vital and meaningful teaching environment (i.e., Hallinger & Heck’s idea of internal processes).

In Taiwan, public senior high school principals are required to transfer from school to school after a certain number of years. Normally, a principal would stay at a school for only two terms, 8 years maximum. Based on my observations, the effectiveness of public senior high schools

often changes due to the change of principal. This fact increases the importance of principals cultivating an environment that contributes to teaching and learning in schools (Lin, 2009). Building a healthy environment that contributes to teaching and learning in schools is one of the key tasks for principal leadership because it dilutes the impact of regular principal transfer on student learning.

The results of a recent survey regarding the leadership development needs for principals in Taiwan indicate that fostering a high-quality environment that contributes to teaching and learning is one of the most necessary areas of growth for Taiwanese principals (Hsien, 2010). The importance of this need mentioned by the principals is about the same as school crisis management. Also, recent curriculum reform in Taiwan has pushed for principals to become more effective instructional and curriculum leaders (Pen, 2006). Principals in Taiwan are facing increased pressure to provide teaching and learning leadership for both teachers and students.

This study's research question seeks to analyze ways that principals can lead schools to cultivate an environment that contributes to teaching and learning. This article also highlights a new leadership development agenda for principals in Taiwan.

LITERATURE REVIEW

Past literature reveals a scattered opinion on principals' ability to cultivate an environment that contributes to teaching and learning. Of the many topics covered in past literature, topics related to principals' leadership and student learning, school learning environment and student learning, and principals' key roles in cultivating the school learning environment are most relevant. They are reviewed next.

Principals' Leadership and Student Learning

Lin (2009) reviewed related important research models and literature to display the influencing mechanism on the relationship between principal leadership and student learning. Several administration and leadership models show the direct and indirect influences of principal leadership on student learning. These include "reviewing the framework of instructional management" (Bossert, Dwyer, Rowan, & Lee, 1982, p. 40), "an orientation to understanding current school leadership" (Leithwood, Begley, & Cousins, 1994, p. 12), "the conceptual framework of research on school administration and management" (Lin, 1999, p. 128), "causal relationships in the multiple linkage model" of leadership and organizational effectiveness (Yukl, 2002, p. 221), "further research assumption model" (Cheng, 2003, p. 233), and "a model of how leadership influences student outcomes" (Firestone & Riehl, 2005, p. 172). Together with other literature (English, 2005; Heck & Hallinger, 1999; Huang, 1999; Leithwood & Duke, 1999; Leithwood & Riehl, 2005; Pen, 2006; Pierce & Newstrom, 2003; Sergiovanni, 2005; Stein & Spillane, 2005; L. W. Wang, 2006; R. J. Wang, 1999), I (Lin, 2009) have indicated that

the ways that educational leadership enhancing the effectiveness of organization is through the direct and indirect influence approaches by principal leadership. The indirect influence action by principals is focusing on building an excellent health condition of the school (i.e., excellent "school internal

processes”). These elements consist of explicit but flexible structure, high quality human resources and interpersonal interactions, positive culture and symbolic meanings, sound power relations and politics, and a good consideration of school environment, policy context, and characteristics of students and teachers. In addition, principals could also exercise direct influences on students’ learning through close interaction with students and implementing activities that related to student learning. (pp. 197–198)

This finding is similar to the opinion of Matthews and Crow (2010). They stated,

Research on school leadership effects on student learning and school effectiveness has found that while principals do not ordinarily have a direct effect on student learning, they have a significant indirect effect. . . . That indirect effect occurs primarily through school leaders’ (broader than principals’) influence on working setting, motivation, and capacity. (pp. 74–75)

In a word, principals must emphasize both their direct and indirect impacts on student learning. However, principals’ effort to cultivate an environment that contributes to students’ learning must become the dominant path.

School Learning Environment and Student Learning

Like the professional learning communities (PLCs), caring learning communities, and learning organizations (Marsick & Watkins, 2005; Matthews & Crow, 2010; Sergiovanni, 1994), school learning environments have been discussed by many researchers. Hord (1997) developed a model to describe PLCs in a synthetic manner. She highlighted five elements of a school’s healthy learning environment: shared vision, supportive shared leadership, shared teaching practice, physical condition and staff quality, and collective creativity. DuFour and Eaker (1998), in a related article, outlined seven similar elements important to a school learning community: shared mission, vision and value, collective inquiry, collaborative team, action oriented and experimental practice, continuous improvement, and outcome-oriented student learning.

Matthews and Crow (2010) summarized a list of 10 cultural elements that are common in most successful PLCs: collaborative teaming, a focus on student learning, a common mission of teaching and learning, participative leadership, high-trust school culture, interdependent culture sustaining continuous improvement in teaching and learning, data-driven decision making, continuous assessment for improved learning, prevention and interventions, and teacher-driven professional development.

Gurr, Drysdale, and Mulford (2006) identified four key components that support the creation of an environment resulting in increased student learning outcomes—the principal’s personal capacity, school-wide professional capacity, organizational capacity, and community capacity. A principal’s personal capacity contains elements of personal knowledge, attitudes, and professional pedagogy and links. School-wide professional capacity includes teacher leadership, teaming, infrastructure, and school-wide pedagogy. Organizational capacity relates to shared leadership, school structure, environment, and learning. Finally, community capacity comprises community networks, relationships, partnerships, and social capital. According to the authors, high levels of school capacity can have a significant impact on teaching and learning.

In terms of the effects of school learning environment on teaching and learning, Louis and Marks (1998) investigated the influence of professional communities on the classroom. According

to the authors, whole-school PLCs can increase the teaching effectiveness of classroom teachers, which in turn has a positive effect on student learning. This is especially true when teachers share the purpose of student learning, participate in collaboration efforts, focus on student learning, communicate teaching practices publicly, and involve themselves in reflective dialogues. Continuous and intentional professional interactions by teachers and collaborative teams are thus key elements of the school learning environment and have major impacts on student learning (Louis & Marks, 1998).

Finally, Matthews and Crow (2010) cited several empirical studies that indicate the positive effects of cultivating the practice of PLCs on student achievement. According to the study, students in schools with successful PLCs demonstrate higher levels of achievement in math, reading, history, and authentic learning.

In summary, according to related literature, the school learning environment that contributes to teaching and learning consists of various elements, including principals' and teachers' high-quality capacity, school culture and climate, school organizational structure, committed school teams and human resources, resource management and conflict resolution, and school–community relationships. The school learning environment influences teachers' teaching practice, student academic achievement, and student attitudes toward learning.

The Key Role of Principal Leadership in Cultivating the School Learning Environment

One of the essential actions a principal can take to build a PLC and foster school innovation is to practice supportive and shared leadership. "The importance of the principal's involvement in establishing effective PLCs is often referred to as *centrality*" (Matthews & Crows, 2010, p. 51). That is, principals are located in the center of the networks of communication. They have the potential to assess and control information and power. The character and leadership practice of a school's principal are thus key to cultivating an environment that contributes to teaching and learning in school.

To be truly effective, principals must play the role of "facilitator" (Matthews & Crow, 2010, p. 74). A successful principal puts faith in teachers' abilities to lead and to facilitate student learning, thereby striving to practice distributed leadership (Stein & Spillane, 2005).

Mitchell and Sackney (2006, pp. 631–636) outlined four key roles that the principal can utilize to build learning communities. The first role, known as the "center," defines the principal as the hub of school functions. In the second role, the principal serves as the "holder" of the vision of the school who keeps the learning community on track. The third role defines the principal's function as the "builder" of school structure, teams, and databases, which help the practice of teaching and learning. Finally, the principal serves as the "role model" of the learning community. "Those who were most successful in creating a learning community were those who served as role models with respect to good teaching strategies, effective collegial processes, respectful treatment of students, and systemic approaches to practice" (p. 636).

In addition to being a cultural role model, the principal must also serve as a facilitator, a central manager, a visionary, and a community builder. Principals must, however, ensure that they do not take on too central a role, as one principal cannot do it all alone.

STUDY DESIGN

Data Collection

I conducted the survey study during a 2009 professional development workshop of all high school principals in Taiwan. During that year, there were 321 public and private senior high schools in Taiwan. These high schools make up the population of this study. I distributed the survey questionnaire and asked all 321 principals to answer the following questions: "How do you shape the environment that contributes to teaching and learning in your school? How do you make the school environment healthier to teaching and learning?" These questions were designed based on definitions of principal's roles and actions from past literature. Principals provided written opinions to me. In total, there were 183 principals who provided their opinions, which represents about 60% of all senior high school principals in Taiwan.

Principals responded in various forms and lengths. Some provided very concrete answers. Others wrote lengthy and informal narratives. Still others focused on the ideas and specific actions of creating a positive learning environment. For example, one principal wrote, "I made reference to other schools' practices. By observing their actions, we considered whether they fit our school, and then we took appropriate actions. We learned from other high schools' strengths" (P 001). Some principals provided several actions. In total, principals cited more than 250 actions.

One possible major limitation of this study is that it relies upon self-reported principal behavior, rather than observed behavior. There might be a gap between a principal's espoused behavior and behavior-in-action. However, the opinions provided by principals do reflect their own observations and reflections of their actions. The data are thus appropriate enough to help answer the research questions of this study.

Data Analysis

I took several steps to analyze the data. First, I read and open-coded all of the responses to identify themes that emerged from the data. Next, I reread and recoded the data and themes regarding the four components of school capacity that lead to increased student outcomes, as noted by Gurr and colleagues (2006), including the principal's personal capacity, school-wide professional capacity, organizational capacity, and community capacity. Finally, I read the text one more time using the theoretical lens of a respectful caring learning community to weave together the actions and themes taken by principals. This helped me rough out the whole picture of the healthy environment for teaching and learning in principals' minds and actions. It also provided the information that can be used to form the suggestions for improving principal leadership development.

RESULTS

The data were analyzed through Gurr and colleague's (2006) view of school capacity building and its four components: personal, professional, organizational, and community capacities. The four components helped to organize principals' responses based upon the methods used to cultivate an environment that contributes to teaching and learning.

The results of the study indicate that high school principals in Taiwan cultivate a productive teaching and learning environment through leading by personal example, improving organizational functions, enhancing professional development for staff, and getting support and learning from communities in and out of school. Each of these possible categories contains a different number of specific actions. The findings of the study are described next.

Principals Leading by Personal Example

One of the ways that principals build a supportive environment for teaching and learning is by acting as excellent models in schools (Mitchell & Sackney, 2006). In this study, more than 50 principals cited their role as a model as a key aspect leading to positive school growth, often citing a variety of perspectives, including morality, behavior, effort, and performance. Although some principals simply mentioned the concept of a role model comprehensively, others pointed out specifically that principals serve as the moral model. Still others focused on the principal acting as learning model or as the performance model. This concurs with what Gurr and colleagues (2006) identified as a principal's key role—using his or her knowledge, skills, attitudes, and professional networks to build capacity in a professional learning community. The concept of the principal as role model in this study is the same as that in Gurr and colleagues' article, but the emphasis and content are slightly different. Principals in Taiwan high schools focused more on the moral model.

Moral Model

Many high school principals responded that in leading the enriched environment of teaching and learning, they are modeling honesty, sincerity, encouragement, devotion, and passion. What follows are two such responses:

Guiding our teachers with positive educational values, such as: warmth and devotion. . . . Leading by example is better than dictating rules. Sometimes, I simply brought good books to our staff, like *"Teach Like Your Hair's On Fire: The Methods and Madness Inside Room"* and *"The Essential 55—An Award-Winning Educator's Rules For Discovering the Successful Student in Every Child."* This helped our teachers be equipped with right philosophies of education. If the teacher is excellent, there is no doubt that the students will be excellent too. In addition, this also kept our school in a healthier condition. (P 013)

I listened to our staff before implementing administrative projects. If it is workable, we did it right away. If there were obstacles, I communicated with them honestly. Honesty is the best way to communicate with people. When you are honest, you will touch colleagues' hearts. They feel part of the community and the *esprit de corps* of the school heightens. The school may not be immune from problems and struggles, but it will not be afraid of facing them. People solve problems together because of your modeling. (P 110)

In the end, leadership is like teaching. Leaders are teachers too (Sergiovanni, 2005). From the perspective of an ethic of caring, modeling is vital in moral education (Noddings, 2002). Likewise, modeling is vital in principal leadership, as it allows principals to demonstrate trust in a healthy school environment.

Learning Model

Many principals also articulated that they act as learners in their school. One principal said, “The principal has to be an enthusiastic learner in school and be the model of teachers” (P 117). Several principals indicated that their own “continuous professional development” (P 062, P 130, P 160) was the most important action influencing teachers in their teaching practice. Finally, one individual stated, “The principal needs to learn a variety of things, including caring for people, learning regulations, learning to be innovative, and learning to be brave in terms of implementing changes” (P 152). This finding echoes Marsick and Watkins’ (2005) argument that the principal must demonstrate professional, relational, and administrative learning.

Performance (Problem Solver) Model

The final model that the principal must show is his or her ability to solve problems of various types. Principals in this study performed well in staffing, communication, listening, foreseeing, understanding needs and responding in the appropriate way, getting consensus, observation, and expecting high performance. Gurr and colleagues (2006) outlined that the principal’s personal capacity includes the use of his or her knowledge to create innovation and new structure. The following are some examples in this study:

I selected the right persons to be administration team members and put them in the right positions. I practiced genuine communication, dialogue, caring. . . . I changed myself before I changed others. I made adjustment to our environment, solved problems and made profit out of it. (P 14)

Utilizing the self-fulfilling prophecy theory and practice into the teaching life of teachers, expecting high performance, and people believed in your positive support. (P 181)

Like principals in PLCs, learning organizations, and caring learning communities (Gurr et al., 2006; Hsien, 2010; Marsick & Watkins, 2005; Sergiovanni, 1994), principals in this study performed well as moral, learning, and performing role models. One thing worth mentioning here is that principals in Taiwan performed well as moral models when they have built an environment conducive to teaching and learning.

Improving Organizational Functions

Setting Visions and Uniqueness, Getting Consensus in Implementation

Setting the vision together, finding the uniqueness of the school program together, and making consensus are the first actions that principals in this study used to improve organizational functions. More than one fourth of principals mentioned that they utilized these actions to increase the energy of their schools when they built a healthy environment. The following are examples of principals who cited these actions:

I communicated with teachers from the vocational sector and the academic sector within our school and asked them to pursue common goals. This shortened the achievement gap between students from different sectors. (P 018)

Together with the frontier teachers, I coordinated and set the vision of teaching of the school. This enabled me to build a high quality environment for high quality teaching and learning actively. (P 066)

I communicated with the staff frequently about the vision of the school. In addition, I talked about the challenges and difficulties of accomplishing the vision and asked the staff to work together. Unity is strength. (P 166)

I worked with key administrators to identify capable and willing teachers with potential in our school. Then we discussed with them to identify our school's potential and strength. The next step was to allocate resources to help them work on the school uniqueness and to support to achieve the goals. (P 055)

A vision of teaching and learning is the direction of a school. It helps a school devote all of its energy to teaching and learning and coordinate all of the efforts to accomplish the uniqueness of the school program (Duffy, 2003; DuFour & Eaker, 1998; Hord, 1997; Matthews & Crow, 2010). Getting people to participate in the process of setting a school vision not only increases the quality of the vision but also facilitates acceptance of the vision.

Building an Effective and Organized Structure

More than 30 principals in this study pointed out that building an effective and organized structure is the second most important mechanism to improve their organizational functions. Among those who cited this response, some such systems included a fair and reasonable room teacher rotation system (P 007), the delegation and responsibility details system (P 129), the teacher recruitment system (P 127), a system that invites the right person to work on the right position (P 014, P 103), and an administrative system that focuses on planning, implementation and evaluation (P 052). Maintaining an effective structure and system allows a school to remain stable, even when the key actors change (Hoy & Miskel, 2001). This stability contributes to the continued cultivation of a supportive environment for teaching and learning.

The structure of the curriculum and teaching committee must be effective too. Several principals mentioned this point.

We changed the division of labor of teaching research communities. After consulting teachers' opinions, we decided that the chair was responsible to set the focus and the goal for the team. Teachers of the team discussed and worked out the content and details of the plan, including schedule, budget, facility, and personnel. After implementation, the group evaluated the effectiveness of the plan. (P 034)

Within the school, we formed a curriculum development task force. The task force discussed the texts of different subjects. It regulated the teaching evaluation system and made sure that high quality teaching became reality. Outside the school, we cooperated with other junior schools and universities to get resources and to bring the stimulus into the school. This activated the growth of our school and teachers and made the school healthier. (P 056)

In addition, some principals argued that innovative and flexible structures are important too. For example, one principal formed an Innovative Management Team to provide suggestions and solve conflicts within the school (P 074). Another principal worked with teachers to analyze to

the structure and duties of each department, eventually finding some duplications and gaps in terms of duties and tasks. This effort resulted in the end of some meaningless routines and the reorganization of certain tasks on a more workable basis (P 042).

Several principals also mentioned explicit changes to their school structures as key components contributing to an environment of teaching and learning. For example, one principal said,

I broke some meetings with a lot of people into several ones with fewer people and asked heads of different departments to chair the meetings. It turned out people were more willing to talk and the outcomes of the meetings were more plentiful. Most importantly, our school cultivated more capable persons with the abilities to listen to others and summarize their different opinions. (P 047).

Another principal made the block schedule more flexible, thereby allowing students to go to the library to check out books, and provided time for teachers to chat about students' recent difficulties and performance (P 115). Several principals mentioned that the way to assign students to appropriate classes must comply with the regulations (P 107, P 166, P 137).

Finally, some principals maintained that the idea and practice of continuous improvement was a key factor in the growth of their school environment. They argued that building a supportive environment for teaching and learning only occurs gradually. The process should thus be in the minds of school members. However, it is important that the principal and teachers feel better everyday (P 002, P 009, P 093, P 108).

Renovating Facilities Regularly

About 30% of the principals responded that they tried to apply resources to upgrade their facilities physically and professionally. The following are some examples.

I renovated the English listening studio. I applied money to set up the exam classrooms and asked the Speech Training Center to use them as the test classrooms. . . . It turned out our teachers became more involved and our students became motivated to learn. (P 003)

The hardware (e.g., buildings, facilities) and software (e.g., administrative management, teachers) of the school were all important, but they must be harmonious. I decorated the school with the feeling of home. (P 16)

Past literature indicates that the physical condition of a school is important to the PLC (Hord, 1997). Based on the responses of the principals and selected examples just presented, principals in this study performed well in this dimension.

Functioning as a High-Quality Administration Team

The next action that principals in this study utilized to improve their organizational functions was to create a high-quality administration team. Although some principals mentioned the formation of a high-quality administration team in general (P 110, P 084), others focused on the establishment of the standard operation procedure by the team (P 178, P 125). Still others emphasized the attitude and abilities of the service provided by the team (P 110, P 163). One principal wrote,

The administrators and I implemented the attitudes and behaviors of three S's: service, support, and smile. In addition, our school provided school development training to our staff regularly. Our administration team became stronger. Then the quality of services provided by our team increased. This enabled our school to become healthier. (P 164)

The service provided by a high-quality collaborative administration team provides the foundation for building an environment that contributes to teaching and learning (DuFour & Eaker, 1998). It is easier for schools to implement a well-conceived vision if they have a high-quality management team.

Involving Authentic, Whole-School Staff Participation

The fifth action that principals cited was the involvement of the entire staff in the process of building a healthy learning environment. This classification featured several specific actions, including inviting different groups to participate in decision making, involving individuals to join in participation, introducing the sense of risk to increase teachers' motivation to participate in school management, utilizing positive language to encourage, and sizing up multiple ways of participation.

When I involved my staff in school issues, the staff found it possible to get rid of unnecessary misunderstandings. This increased their willingness to implement decisions made by the administrators and other committees. (P 004)

I picked up some important issues or questions to survey all members. This increased the degree of participation in our school. This also facilitated teachers' willingness in taking care of our children. (P 045)

Encouraging all members of the school to participate in various issues while increasing the entire school staff's motivation to accept the implementation processes helps schools form an environment that contributes to teaching and learning (Matthews & Crow, 2010), and in the process distributes the leadership of the staff.

Communicating Authentically

Communicating authentically was the final element mentioned by Taiwanese principals. Principals stated that communication in schools with supportive environments for teaching and learning was two-way and genuine. Principals' responses covered a broad range of topics, including informing staff of key details, practicing horizontal and vertical communications, sharing informative articles, communication for the purposes of discussing vision and cooperation, formal and informal communications, group and individual communications, utilizing information technology to help communication, and the construction of a strong communication platform. The following are some examples of principal responses related to authentic communication:

By improving the past vertical communication (teachers→administrators→principal), we eased many questions caused by miscommunication. Teachers in our school became more willingly to speak out with their innovative ideas. (P 020)

I tried to get acquainted with all the staff and worked hard to communicate with them frequently knowing their needs and opinions about school improvement, particularly in teaching and learning related issues. (P 120)

Enhancing Professional Development

Another approach used by the principals in this study was the improvement of the teaching work force at the school. Unlike Gurr and colleagues' (2010) ideas of professional capacity, however, the Taiwanese principals often classified the idea of team building as a function of the administration. Despite this difference, principals' definitions of teacher professional development, what it means to focus teacher attention on student learning, and how to experiment with effective pedagogy were the same as Gurr and colleagues' findings.

Based on principals' responses, about one fourth of principals mentioned the importance of teacher professional development as a key component to fostering a healthy school environment (e.g., P 130, P 141, P 167, P 111, and P 017). Other responses indicated that the relative stability of teachers was the key for developing teachers professionally (e.g., P 010). Principals also pointed out the importance of the rational and gradual design of a school's professional development plan. "More of the same" would not meet the objective of teacher professional development (e.g., P 002, P 132). Finally, many principals believed that increasing school-wide acceptance of change as well as building upon the educational values of teachers was one of the major purposes of teacher professional development. Many principals mentioned the need for enhanced teacher quality, something that can be addressed through professional development activities. Increasing the degree of teacher professional autonomy, level of teaching confidence and commitment, capacity for curriculum design, and team teaching were all fundamental factors important to a supportive school environment.

My analysis of the data revealed two major themes related to professional development—"focusing on student learning" and "encouraging classroom observations and dialogues while enhancing teaching quality." The two themes are discussed next.

Focusing on Student Learning

In this study, the first action that principals used to enhance staff professional development was to help their teachers focus on student learning. This included implementing supportive actions and providing guidance to at-risk students and students with behavior problems. Other important actions consisted of focusing on students' morality, improving the atmosphere of studies, and increasing students' motivation to learn.

For building the environment that contributes to teaching and learning and cultivating the custom and atmosphere of students' studies, I did a lot of things. First, I set up a mini library for each classroom. Second, our school designed a convenient process for students to check out books. Third, we also designed our school library to be a comfortable place for students to come and read. Finally, we designed a plan encouraging our students to submit what they have learned from their book readings. (P 087)

By providing guidance to students with deviant behaviors, the whole environment of teaching and learning became much better. (P 029)

Past literature indicates that an environment that contributes to teaching and learning must focus on student learning (Lin, 2010; Matthews & Crow, 2010). Furthermore, schools must remove factors unhealthy to teaching and learning (DuFour & Eaker, 1998). In a word, principals must deal with factors that are positive and negative to student learning simultaneously.

Encouraging Classroom Observations and Dialogues While Enhancing Teaching Quality

Principals also enhance professional development by encouraging teachers to participate in classroom observations and dialogues. Several principals encouraged their teachers to present and share information they had learned from workshops (P 19, P 37, P 165). Other principals encouraged teachers to participate in joint action research projects (P 045, P 180). Such activities help to facilitate professional dialogues between teachers and administrators, whereas formal and informal interactions help to increase the quality of teaching (P 155, P 070, P 019, P 142).

Many principals cited classroom observations as aids to organizational learning, claiming they built a supportive environment for teaching and learning. For example:

We established a plan that encouraged and arranged each teacher to do (or attend) two individual or group classroom observations each semester. In addition, each teacher did one teaching demonstration every semester. We even had a "passport" for classroom observation. By learning from others' teaching, teachers improved their weakness. Teachers learned from others and grew together. (P109)

We did a lot of things to make our school healthier in terms of increasing the quality of teaching and learning. We did classroom observations, action research, had teachers design their teaching materials by themselves. . . . All these helped us meet students' multiple interests, creativities, development, and differences. (P 177)

Past studies have found that one of the characteristics of successful professional learning communities is the reduction in isolated teaching practice and the increase in teachers' willingness to share their expertise (Hord, 1997; Matthews & Crow, 2010). The results of this study confirmed these prior findings.

Getting Support and Learning From Communities In and Out of School

The final approach that principals used to build an environment conducive to teaching and learning was to garner support from communities inside and outside of school. Gurr and colleagues (2006) maintained that principals build community capacity through family-school relationships, community networking, and relationships within the school. These relationships form the social capital of the school. In this study, principals increased the social capital of their schools (Gurr et al., 2006) by learning from other schools' successes, soliciting and deploying family and community resources, and actively fostering positive relationships.

Learning From Other Schools' Successes

Several principals indicated that they were able to improve the conditions of their schools by visiting other successful high schools, learning from them, and utilizing the successes of other schools within their learning context.

I went with the school's administrators and heads of subject departments to other schools with high reputations. School visits allowed us to experience firsthand some creative ways of teaching and learning, using IT technology, beautifying the teaching context. If they can do it, we can do it too. (P 062)

One principal stated explicitly, "Learning from others and making adjustments to our situation means a lot to our school improvement efforts" (P 1).

Soliciting and Deploying Family and Community Resources

Principals in this study also indicated that resources were very important for building a productive school environment and increasing school effectiveness. Resources are not necessarily monetary but can also include human resources, relational resources, and supportive resources, all of which are equally critical (Hoy & Miskel, 2001). Many principals mentioned soliciting and deploying family and community resources as integral to the success of schools. For example, one principal pointed out that he "added two more dimensions, community and family, to pursue the common goals" (P 022). Another principal asked teachers "to do home visits and to conduct mutual communication" (P 078) to get support from the family. Principal number 44 "developed teaching programs related to the community and got support from the community making the program stronger." Finally, Principals 120, 156, and 183 committed themselves to getting support from social, communal, and educational institutions in order to enrich their whole-school environments.

Caring, Rewarding, and Positive Relationships

Principals in this study mentioned that caring, rewarding, and encouraging attitudes among principals, administrators, and other school members are key factors to facilitating positive relationships. Many principals utilized these skills to help build an environment supportive of teaching and learning.

We made and passed the regulations of rewarding teachers and students who performed well. This action helped increase the motivation to teach and to learn. (P 174)

I tried to increase teachers' and students' sense of honor. Make them proud of being a member of the school. (P 182)

The opportunity to interact with school members is important as well. "I tried to change the thinking of teachers. They could not do things selfishly" (P 033) mentioned by one principal. Another example indicated that "utilizing after-class time, I tried to increase the connections between teachers and students" (P 122). Finally, one principal responded that "getting the collaborations between administrators and teachers, I accomplished the harmony of the school" (P 049).

Finally, by holding various activities within the school, principals are able to increase the number of opportunities available for communication and interaction. For example, one principal mentioned that “holding activities stimulated the union of the whole school and increased staff capacities. I also arranged recreational activities to facilitate organizational interactions” (P 024). Another principal wrote that “the opportunities from holding activities were helpful to change the mental models and values of members” (P 067). In the learning community, positive and trusting relationships are fundamental (Noddings, 2002; Sergiovanni, 1994).

DISCUSSION

Based on the analysis of the Taiwanese high school principals' responses, I have discerned a common theme and implication among the data. The theme is the ideal picture of an environment that contributes to teaching and learning in schools that is weaved together by principals' actions. The implication is about the future focus of principals' professional development in Taiwan.

A Respectful and Caring Learning Community

Although the primary focus of this study was an investigation of the ways that high school principals can cultivate an environment contributing to teaching and learning, their responses also weave together a clear picture of an ideal learning environment, which I call a “respectful and caring learning community.” Holistically, such a community represents the ideal collection of factors that contribute to an environment supportive of effective teaching and learning.

Based on principals' responses to survey questions, I define a respectful and caring learning community as the respectful ethos formed by a school's web of relationships, which work to reduce the learning gaps present among groups of students divided by student backgrounds. Caring and learning are related, and principals have indicated that most schools implement a nontracking system of assigning students to classrooms, which prevents the school from distributing resources to students unevenly. This creates a fair and just teaching and learning environment for teachers and students. By reviewing principals' responses, the values of respecting teachers and their expertise, teachers' autonomy and students' right to learn became obvious. Finally, the four value themes of respect, caring, learning, and community are connected together to shape the ideal environment that contributes to teaching and learning in the principals' minds.

Implication for Leadership Development

One of the objectives of this article was to highlight a new leadership development agenda for principals in Taiwan. How principals develop professionally and effectively is an important issue in almost every country (Cheng, 2003; Heck & Hallinger, 1999; Hsien, 2010; Leithwood et al., 1994). In Taiwan, principal leadership training and development programs focus more on developing a principal's personal capacity than increasing a principal's capacity to build an environment contributing to teaching and learning. Combining the consensus among related literature (Gurr et al., 2006) with the findings in this study, one thing is certain: Principals in Taiwan

must push their own development by encouraging respectful and caring learning communities. Citing Hargreaves and Fink's work, Matthews and Crow (2010) indicated the importance of capacity building for principals. They argued,

Instead of temporary student learning gains or school improvement that last only while the principal remains in the school, capacity building permits "sustainable leadership (in order to) . . . create lasting, meaningful improvement in learning" (Matthews & Crow, 2010, p. 75)

Based on the findings of this study, in order to build an environment that contributes to teaching and learning in schools, principals must develop their capacities within four areas. They have to learn how to lead by personal example, how to get support from communities in and out of the school, how to improve organizational functions, and how to enhance professional development for members.

CONCLUSION

Utilizing data from 183 high school principals in Taiwan, this article analyzed ways that principals cultivated an environment that contributes to teaching and learning in their schools. In addition, this article described the ideal picture of such an environment, as evidenced by the principals' comments. The major implication for principal professional development was for principals in Taiwan to build a respectful learning community in their schools.

I propose the idea and practice of a holistic combination of cultivating respectful and caring learning communities that contributes to teaching and learning in schools. Principals contribute to that environment through leading by personal example, getting support and learning from communities in and out of the school, improving organizational functions, and enhancing professional development for members, which in turn influences what happens in teaching and learning. That is the core task of schools.

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Exploring School Improvement in Hong Kong Secondary Schools

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Scholars have increasingly sought to understand how the process of school improvement differs among schools operating in different school levels, conditions, and contexts. Using Rosenholtz's (1985) conception of "moving" and "stuck" schools as a framework for thinking about school improvement, this study examines the learning outcomes of 39 Hong Kong secondary schools over a 3-year period. We examine whether features of leadership and school capacity differed with respect to these learning outcomes within the sample of moving and stuck schools. This research in Hong Kong has identified several factors that appear to synergistically contribute to differences in patterns of improvement in learning across different subjects in both moving and stuck schools. These factors include resource management of principals and school capacity in terms of professional learning community; workload of teachers; alignment, coherence, and structure; and resource capacity. This study extends the research on leadership and capacity building as a means of school improvement, in the process elaborating on their impact within a non-Western society.

A decade ago, Jackson (2000) compared school improvement to a "journey." This metaphor highlights school improvement as a process of change that unfolds over time. Scholars have observed that the nature of this journey often differs across schools, even among schools that operate within the same education system, school district, or local community (e.g., Rosenholtz, 1989). These differences apply to trends in learning outcomes as well as in the capacity of schools for academic improvement (Edmonds, 1979, 1982; Fullan, 2007; Hallinger & Heck, 2011; A. Hargreaves & Fullan, 1998; D. Hargreaves, 1995; Mulford & Silins, 2003; Rosenholtz, 1989).

Rosenholtz (1989) earlier proposed that schools could be classified as either "moving" or "stuck" based on an analysis of growth trends in learning outcomes. Employing this lens, Rosenholtz then sought to understand whether the internal conditions that impact teaching and learning in "moving schools" differed in any consistent ways from those that were found in "stuck schools," that is, schools that were not demonstrating improvement in learning outcomes. Although school improvement literature frequently cites Rosenholtz's (1989) conceptualization of school improvement, relatively few studies have examined its efficacy through empirical investigation (e.g., see Goddard, Goddard, & Tschannen-Moran, 2007; Timperly & Robinson, 2001; Willms, 1992).

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This article addresses this issue by comparing patterns of school improvement in 39 Hong Kong secondary schools. The research aims to identify and explore school conditions that explain differences in the patterns of improvement in school learning outcomes over time. More specifically, the study addresses the following research questions:

1. Can we identify patterns of school improvement journeys in terms of schools that are moving and schools that are stuck with respect to growth in learning outcomes over time?
2. Are there differences between the leadership practices and conditions of schools that demonstrate consistent improvement in learning outcomes and those schools that do not?

We have established the relevance of this research through reference to research policy and practice. Our guiding framework of “moving schools” and “stuck schools” resonates with current terms used by researchers such as “stagnating performance” (see Hallinger & Heck, 2011), and policymakers such as “coasting schools” (see Cameron, 2011). As previously suggested, the task of identifying patterns of improvement in school performance and linking these to features of the school should be a high priority for policy-oriented research in education. Studies have already begun to support the theoretical proposition that schools in different contexts and at different points in their improvement journeys require different improvement strategies (Belchetz & Leithwood, 2007; Day et al., 2009; Goldring, Huff, May, & Camburn, 2008; Hallinger, 2011; Hallinger & Heck, 2011; Louis, Leithwood, Wahlstrom, & Anderson, 2010). This study seeks to contribute to this evolving knowledge base on alterable school conditions that contribute to school improvement.

THEORETICAL PERSPECTIVE

The literature on school improvement has tended to examine patterns of change in the educational processes and outcomes that characterize the school as an organizational unit. Strongly influenced by studies of effective schools (e.g., Edmonds, 1979, 1982), this approach assumes that the most powerful strategies for improving the quality of teaching and learning in schools are school-wide interventions (Crandall, Eiseman, & Louis, 1986; Edmonds, 1982; Firestone & Corbett, 1988; Geijsel, Sleegers, & Van den Berg, 1999; Geijsel, Sleegers, Van den Berg, & Kelchtermans, 2001; Hallinger & Heck, 2010; Jackson, 2000; Mulford & Silins, 2003; Stoll & Fink, 1996). Also implicit in this perspective is the view that the school’s culture and capacity to improve represent key mediating variables related to improvement efforts (e.g., Barth, 1990; Deal & Peterson, 1990; Fullan, 2007; Hallinger & Heck, 2011; A. Hargreaves & Fullan, 1998; D. Hargreaves, 1995; Louis et al., 2010; Saphier & King, 1985; Sarason, 1982; Sleegers, Geijsel, & Van den Berg, 2002). Thus, developing the schools’ capacity to improve represents an increasingly important focus for both research and practice in school improvement.

We observe that educational policy, research, and practice have a well-recognized tendency to attempt reforms intended at improving school learning through strengthening schools’ capacities (Firestone & Corbett, 1988; Fullan, 2007; Hall & Hord, 2002; Hawley & Rosenholtz, 1984; Lipham, 1961). International studies carried around the world have reported some similar processes in school improvement plans resulted in enhancements in student learning (e.g., Edmonds, 1982; Firestone & Corbett, 1988; Fullan, 2007; D. Hargreaves & Hopkins, 1994; Stoll & Fink, 1996). These processes typically engage school staff in analyzing data that describe facets of the

school's learning practices and climate as well as performance on desired learning outcomes. Staff then identify strengths and areas for improvement and incorporate these into a framework of goals, performance targets, and strategies for improvement (Fullan, 2007; Stoll & Fink, 1996).

A key assumption underlying these processes is that schools can improve their performance by focusing on alterable school-level conditions linked to student learning. School improvement research has, therefore, sought to inform practitioners about the relationship between potentially alterable school-level conditions and improvement in student learning. An increasingly rich vein within this broad line of inquiry has led scholars to explore schools as contexts for improvement (Day et al., 2009; Hallinger & Murphy, 1986; Jackson, 2000). This research recognizes that schools enter the school improvement journey at different points in their own historical development and with different capacities. For example, Hallinger and Heck (2011) sought to understand whether it would be possible to identify a set of "common journeys" among schools as the process of change unfolds over time. Employing a sample of 200 primary schools, they tracked school progress in reading and math over a 4-year period. They were able to classify growth in learning outcomes in this sample of schools into three broad patterns of school improvement: high improvement, moderate improvement, and low improvement schools. Hallinger and Heck then linked these patterns of change in school performance to changes in the academic capacity of the schools. They drew several implications from their findings.

In our view, these [school] "conditions" include not only important features of the context (e.g., student composition, school size, school level) but also the location (i.e., current status) and trajectory (i.e., stable, declining, improving) of the school on its "journey" of school improvement. One can say that these factors combine to create a "unique set of challenges" for each school. However, we wish to suggest that longitudinal research on schools over a wider set of contextual and process conditions can provide results that shed light on how leaders respond to these changing conditions in order to develop the capacity of their schools to improve. (Hallinger & Heck, 2011, p. 22)

Despite these findings, most recent literature on school improvement continues to rely too heavily on the interpretation of findings that do not explicitly describe change and improvement in schools: We assert that a robust strategy for developing substantive knowledge concerning valid strategies and practices for *school improvement* must include the analysis of longitudinal data that describe the performance of relatively large numbers of schools over time (Day et al., 2009; Hallinger & Heck, 2011; Willms, 1992). In the absence of longitudinal data, school improvement research is unlikely to develop a more sophisticated understanding of the nature of school improvement processes and outcomes in schools operating under different conditions (e.g., different cultures, community types, school levels).

Opdenakker and Van Damme (2007, pp. 179–180) reinforced this argument in their own study of school improvement.

While in the past researchers often concentrated on one specific potentially effectiveness-enhancing factor (e.g. school leadership), or investigated the influence of several factors on outcomes without taking into account the possibility that factors relate to each other, nowadays there are calls to pay attention to the interrelatedness of factors, the direct and indirect effects of factors, the mediated effects of factors, and to use time-ordered modeling procedures like path analysis or structural equation modeling. So, a plea for more complex models is made. (see, for example, Witziers, Bosker, & Kruger, 2003)

From a practical perspective, longitudinal data are needed if we are to gain a better understanding of the patterns of change that occur across schools during the “journey of school improvement” (Jackson, 2000). The paucity of longitudinal data with which to conduct research on improvement across large numbers of schools has, however, until recently stalled progress in identifying and understanding patterns of change in the improvement of schools. Indeed, as previously noted, it is only relatively recently that researchers have begun to conduct longitudinal studies of school improvement on a scale that is capable of linking key improvement foci to conditions of the school’s context and “stage of improvement” (e.g., Day et al., 2009; Hallinger & Heck, 2010, 2011; Heck & Hallinger, 2011; Mulford & Silins, 2003).

These theoretical perspectives guided our research design as well as the framing and selection of variables for the current study. In this study, we sought to operationalize Rosenholtz’s (1989) conceptualization of moving and stuck schools employing our own empirical data. Following Opdenakker and Van Damme (2007), we incorporated contextual conditions as a set of moderating variables. Building on Hallinger and Heck’s (2010) findings, we employed a longitudinal design that could capture change as an unfolding process. Finally, the study centered on leadership and school capacity as central constructs proposed to impact growth in student learning over time.

METHOD

This study sought to examine the impact of leadership and capacity on school improvement in a sample of 39 secondary schools in Hong Kong. The research employed a post hoc survey design in which we examined trends in school performance results over a 3-year period along with a retrospective survey of key staff. Day and colleagues (2009) previously used a similar design to study school improvement in the United Kingdom. The present design differed from Day et al.’s (2009) study in that we analyzed the relationship of leadership and school conditions with learning growth by using schools’ value-added data for a 3-year period. The relative strength of this design lies in its greater ability to analyze longitudinal data that describe changes in student performance over time.

Sample

We sent invitations to participate in this study to the many principals of Hong Kong’s 498 secondary schools. Forty-eight principals offered access to their school achievement data and engaged their staff in responding to the survey. The analyses contained in this report refer to data obtained from 39 of those schools. An inspection of the background of the participating schools indicated that they represented different geographic areas and were governed by a broad range of school sponsoring bodies. Thus, although this is a convenience sample, we suggest that the schools are roughly representative of Hong Kong secondary schools with respect to socio-economic status, geography, and school board membership.¹

¹According to the most recent data available, there are only 457 schools in the major districts. Our 39 schools represented about 7%, 8%, 7%, and 10% of these districts. There are 77 fee-paying schools receiving the government direct subsidies, but only three were in our sample. All other 36 schools are aided by the government and offering free

Informed by similar projects in other settings (Day, Stobart, Sammons, & Kington, 2006), this research focused on gathering the perceptions of Key Staff, which the study defined as teachers nominated by participating principals as active participants in the schools' improvement efforts. Day and colleagues (2006) argued that Key Staff represented a pool of informants with a clear understanding of school policies and close awareness of the leadership practices of their principals.

In total, 179 Key Staff from 48 secondary schools returned the questionnaire. Because the principals nominated their own Key Staff members, it is of course possible that the opinions represented by these teachers could be biased. To reduce the fear that their views would be disclosed to their principals, steps were taken to assure the staff that their responses would be treated confidentially, with respect to data collection processes, reporting of results, and the use of complementary data sources (e.g., students).

Demographic information collected from the survey included gender, age group, highest qualification, formal role, years of teaching in the present school (and in total), and years in their current role in present school (and in total). Selected demographic data describing the survey respondents are shown in Table 1. These resultant profiles indicate that the respondents were experienced teachers who had worked for a considerable number of years in their current schools. This increased the likelihood that they could provide an accurate account of their school's leadership practices and conditions. The demographic data were also used to filter out participants not qualified for taking part in this study, such as those working in their present schools fewer than 3 years.

Data

The data employed for the analyses contained in this article came from two sources. The first source was a set of survey instruments. The second was student achievement scores obtained from the Education Bureau of Hong Kong.

Instruments

We developed two sets of instruments targeting key staff for this study. One focused on school conditions, whereas the other focused on the leadership practices of individual principals. We adapted the instrument measuring school conditions from the *Organizational Conditions and School Leadership Survey* instrument developed by Leithwood in Canada (Leithwood & Jantzi, 2000). We made extensive modifications in order to align the scales with the Hong Kong school context. More specifically, the changes addressed differences in role expectations and behaviors between the Canadian and Hong Kong cultural contexts.

Four to seven items covered each of the seven school conditions—*trust, communication, professional learning community, workload* (of teachers), *resource capacity, alignment, coherence,*

education to students. Regarding school sponsoring bodies, the 39 schools represented 33 sponsoring bodies with five schools from Hong Kong Catholic Diocesan, the largest School Sponsoring Body in Hong Kong. Our sample may be slightly underrepresenting schools from the Anglican Church and the Chinese Christ Church, but we considered this would not affect our findings much.

TABLE 1
School Demographics

	Missing Value			
Gender	Male: 107 (59.8%)			
Age	25–34: 17 (9.5%)	35–44: 77 (43%)	45–54: 71 (39.7%)	Female: 70 (39.1%)
Academic qualification	Certificate: 3 (1.7%)	Bachelor's: 63 (35.2%)	Master's: 107 (59.8%)	55 or older: 13 (7.3%)
Current roles	Vice-principals: 56 (31.3%); panel chairs: 96 (53.6%); senior teachers: 46 (25.7%)			
Experience of teaching in the present school	0–3 years: 2 (1.1%)	4–7 years: 15 (8.4%)	8–11 years: 18 (10.1%)	12 years or older: 132 (73.7%)
Experience of teaching in all schools	0–3 years: 0 (0%)	4–7 years: 7 (3.9%)	8–11 years: 9 (5%)	12 years or older: 159 (88.8%)
Experience the current role in the present school	0–3 years: 46 (25.7%)	4–7 years: 46 (25.7%)	8–11 years: 34 (19%)	12 years or older: 50 (28%)
Experience in the current role in all schools	0–3 years: 44 (24.6%)	4–7 years: 38 (21.2%)	8–11 years: 29 (16.2%)	12 years or older: 55 (30.7%)

Note. Figures are shown in count ($N = 179$) followed by percentage in brackets.

and structure, and support for students—combining for a total of 33 items. The questionnaire was set on a 6-point, forced-choice Likert scale to indicate the magnitude (i.e., *slightly*, *moderately*, and *strongly*) of agreement or disagreement with various characterizations of schools. For example, an item for measuring professional learning community read, “Teachers are encouraged to develop and implement new practices”; for measuring workload, “Teachers’ workload in this school is quite fair compared with teachers in other schools”; and for measuring alignment, coherence, and structure, “Our strategies are formulated around our school purposes.”

We also developed a leadership survey instrument to measure the leadership strengths of school principals. This validated scale (Walker & Ko, 2011) comprised 33 items covering seven dimensions of school leadership practice identified in the literature. The seven dimensions were (a) strategic direction and policy environment; (b) teaching, learning, and curriculum; (c) leader and teacher growth and development; (d) staff management; (e) resource management; (f) quality assurance and accountability; and (g) external communication and connection. On a 6-point, forced-choice Likert scale, respondents were asked to rate the extent (varying from *very significantly* to *not at all*) to which an item describing their principal’s leadership practices was perceived to have contributed to school improvement over the past 3 years. For example, to measure the leadership dimension of strategic direction and policy environment, we used an item such as “Helps clarify the reasons for our school’s improvement initiatives,” whereas for resource management, one item was “Allocates resources strategically based on student needs.”

Student Achievement Data

The study also employed student achievement data obtained from the Hong Kong Certificate of Education Examination (HKCEE). The HKCEE is a standardized examination taken by most Hong Kong students upon completion of their 5-year secondary education. Since the early 2000s, Hong Kong’s Education Department Bureau has made “value-added information” on this exam available to schools on an annual basis. This system provides a value-added account of secondary school student performance between S1 and S5 (the 1st and the 5th year of secondary schooling). The data are treated as highly confidential because there is considerable interschool competition for students within Hong Kong. Nonetheless, schools are encouraged to employ the data for the purpose of school development planning.

One of the strengths of this lies in the perspective offered on student growth in learning across a diverse set of subjects, as the HKCEE provides schools with estimates for most of the subjects taken by local secondary school students. The profiles provided to schools allow staff to compare their estimates of performance in school subjects with those of all schools in Hong Kong, schools of similar intake and schools within the same district. However, we noted that it is also noted (Education Bureau, 2011b):

The estimates provided by SVAIS provide information about the relative progress of students in different cohorts, schools and subjects; they do not address the issue of absolute standards. They cannot be taken as definitive and never explain why a school is performing better or worse than expected. This can only be addressed at the individual school level and in the light of local knowledge about the school, its students and its staff.

Because we did not have all the estimates for all schools in Hong Kong, any classification of school performance based on the estimates of our sample would be biased. Thus, we compared the value-added stanines of the cohort in 2006 with those of the cohort in 2008 as a means of assessing school improvement. We calculated the value-added stanine of a school based on its raw, value-added estimate scaled to a stanine ranging from 1 to 9 (Education Bureau, 2011a). Each stanine corresponds to one of nine intervals of a normal distribution that has a width of 0.5 standard deviations, excluding the first and the last. In other words, for classifying the relative school improvement of schools, value-added stanines are superior to value-added estimates because they also indicate the distribution information. Researchers have employed stanines as a means of monitoring secondary school performance in Hong Kong since the introduction of school learning performance profiles about a decade ago.

It would have been possible to compare school improvement based on the value-added stanines of individual subjects like English and mathematics. However, we chose to select a measure referred to in Hong Kong as the “Best Six Subjects.” This measure reflects the value-added stanine for student achievement in the Best Six Subjects selected from among the larger set of subjects tested in secondary schools. This measure is assumed to be a better indicator of “overall” school improvement in secondary schools than relying on English and mathematics. Indeed, in many respects it provides a much more comprehensive and balanced picture of school performance.

Within the study, each school will have a set of six subjects in which it has demonstrated relatively greater gains in value-added estimates than in other subjects. This set of Best Six Subjects may vary from school to school, from cohort to cohort, and from student to student. However, schools will be compared among each other in any six subjects taken by their students. The system’s selection of a school’s Best Six Subjects is based on the performance of an individual student, rather than on the whole cohort’s performance.

This combined measure of a varied set of subjects is fairer than a combined measure of a fixed set among local educators because it can better reflect a school’s journey of school improvement at different points in its historical development. Schools need not be compared using subjects in which they are more likely to have disadvantages for other reasons. For example, this would allow comparisons across schools where the medium of instruction is Chinese and those schools where the medium of instruction is English. Moreover, because the Hong Kong Examinations and Assessment Authority have reported the related statistics for many years, local educators and the public have generally accepted the Best Six analysis as the key indicator of overall performance.

When comparing value-added stanines of different years, we are comparing the performances of different cohorts. That is, for a school with a stanine of 6 in 2006 and a stanine of 7 in 2008, we regard a positive difference in stanine as an indication of school improvement over three years. Willms (1992) suggested that “growth measures are more reliable if they are based on measurements taken on at least three occasions” (p. 36). Also consistent with Hallinger and Heck’s longitudinal study of school improvement, in the current study we analyzed change in student learning outcomes over a 3-year period. Given that stanines can fluctuate yearly, we consider a 3-year period the minimum period necessary to observe meaningful growth in school improvement.

Stanines, however, have some limitations when monitoring student performance. For some statistical purposes, stanines may be too crude, because two value-added values in the same stanine can be further apart than two value-added values in adjacent stanines. More important, the distribution information is broad, as the number of schools in each stanine is not equal but instead

varies by its location in the distribution. For example, the number of schools with a stanine of 1 is about 4%, whereas the number with a 5 is 20%. An improvement from stanine 1 to stanine 2 is thus not comparable to an improvement from stanine 8 to stanine 9, though both involve a difference of 1 in stanine. Nonetheless, school systems often use the value-added to monitor school performance.

Data Analysis

The data were double-entered and imputed to ensure accuracy. Missing data were first analyzed to ensure there were no nonrandom patterns before multiple imputation was performed to finalize the data set. Data analysis proceeded in three main stages: an initial determination of whether schools could be empirically classified as “moving” or “stuck,” a validation of our instruments, and an analysis of leadership and school capacity between those two groups of schools classified as “moving” or “stuck.” We discuss the procedures for classifying schools and instrument validation in this section of the article. We then present the results of our classification and the relationship of leadership and school capacity in the results section.

Moving and Stuck Schools

This research began with the initial goal of classifying schools in terms of patterns of improvement among learning outcomes over time. More specifically, we used Rosenholtz’s (1989) conceptualization of moving and stuck schools. Thus, in our first step, we developed clear conceptual and operational definitions of the construct of moving and stuck schools. We conceptualized “moving schools” as schools that demonstrated consistent, sustained, positive growth in student learning and stuck schools as those with a performance that was stable or declining over time. We operationalized these definitions through reference to a school’s improvement in value-added stanine scores obtained from their Best Six Subjects assessed by the HKCEE between 2006 and 2008.

We began by categorizing the schools based on their starting point in 2006. We classified schools as having a low starting point, moderate starting point, or high starting point based on their stanines in 2006. Stanine 1 to 3 indicated a low start, 4 to 6 a moderate start, and 7 to 9 a high start. In the second stage, we examined growth in learning outcomes among schools in each of the three groups over the 3-year period, classifying schools as *Declining*, *No Improvement*, or *Improving*. Finally, in the third stage, we combined schools in the Declining and the No-Improvement categories to create our category of *Stuck* schools. This broad approach to classification enabled a clearer contrast with schools that were located in the Improving or Moving category. This reflected the conceptualization of school improvement described earlier in which we sought to differentiate Moving and Stuck schools. We present the results of these analyses in the following section of the article.

Instrument Properties

We began analysis of the instrument’s measurement properties with descriptive statistics and tests of scale reliability (see Table 2). The reliability tests indicated strong internal consistency for

TABLE 2
Descriptive Statistics and Reliability Coefficients for the Leadership Dimensions and School Capacities

Leadership	<i>M</i>	<i>SD</i>	Max	Min	Reliability Coefficient (α)
Strategic direction and policy environment	4.78	.69	5.19	3.31	0.85
Leader and teacher growth and development	4.48	.70	5.32	4.17	0.87
Staff management	4.49	.74	4.61	3.83	0.86
External communication and connection	4.63	.79	4.46	3.89	0.84
Resource management	4.66	.77	4.54	3.98	0.89
Quality assurance and accountability	4.38	.80	3.91	3.05	0.87
Teaching, learning, and curriculum	4.60	.79	4.13	3.38	0.87
School capacity					
Trust	4.95	.656	6.00	2.25	0.76
Communication	4.68	.716	6.00	2.50	0.77
Professional learning community	4.63	.587	6.00	2.50	0.84
Workload	4.55	.795	6.00	1.00	0.76
Resource capacity	3.60	.959	6.00	1.25	0.77
Alignment, coherence, and structure	4.85	.657	6.00	2.80	0.86

the current leadership practice scale and its seven subscales with the Cronbach's alpha ranging from .84 to .87. The reliability of the whole scales and subscales of school conditions also indicated reasonably strong internal consistency with Cronbach's alpha ranging from .76 to .86.

In general, two scales seemed to yield results with a model fit ranging from satisfactory to good.² For the leadership data, the seven-dimension model of leadership produced most of the goodness-of-fit indices satisfactory.³ Similarly, the seven-factor model of school conditions produced satisfactory goodness-of-fit indices. The overall variability of the school conditions was considerably higher than the leadership dimensions. The means and standard deviations of the seven school conditions shown in Table 3 indicate that resource capacity was generally perceived as scarcer in most schools (i.e., a lower mean) and variations of this condition across schools were larger.

Table 3 shows the Pearson correlation results obtained for the intercorrelations between the seven leadership dimensions and the two school conditions selected for inclusion in the analyses presented in this report. All pairs were found to be significant at $p < .01$ level. The data further suggest that resource capacity and workload tended to be weakly correlated with other school conditions in Table 3. This suggests that these school conditions may be *qualitatively different* from other school conditions that were more closely correlated. Of interest, resource capacity

²We examined the scales against the data using LISREL 8.8 (Jöreskog & Sörbom, 1993). We ran a confirmatory factor analysis (CFA) for each scale allowing the factors to correlate freely. The fitness of the CFA model was evaluated using multiple indices such as chi-square, root mean square error of approximation (RMSEA), together with the non-normed fit index (NNFI), the comparative fit index (CFI), Incremental Fit Index (IFI), Relative Fit Index (RFI), and the squared root mean residual (SRMR). In general, the chi-square will be less reliable and become significant when the degree of freedom increases and other fit indices are considered better indicators of the model fit (Bollen & Long, 1993).

³³ $\chi^2(443) = 899.12, p = .00$; RMSEA = .077 with 90% CI = .070, .085 and p value for CFI = .00; NNFI = .98; CFI = .098; IFI = .98; RFI = .96; SRMR = .052.

TABLE 3
Pearson Correlation Matrix of the Seven Leadership Dimensions and Six School Conditions

Leadership/ School Conditions	Strategic Direction and Policy Environ	Leader and Teacher Growth and Develop	Staff Management	External Communication and Connection	Resource Manage	Quality Assurance and Accountable	Teaching, Learning and Curriculum	Trust	Communication	Professional Learning Community	Aligned, Coherence and Structure	Resource Capacity	Work- load
Strategic direction and policy environment	1												
Leader and teacher growth and development	.770**	1											
Staff management	.769**	.790**	1										
External communication and connection	.727**	.678**	.687**	1									
Resource management	.786**	.828**	.739**	.734**	1								
Quality assurance & accountable	.654**	.577**	.627**	.483**	.542**	1							
Teaching, learning, and curriculum	.761**	.737**	.726**	.583**	.629**	.818**	1						
Trust	.174	.213	.301	.179	.107	-.055	.146	1					
Communication	.214	.289	.390*	.253	.174	.065	.259	.687**	1				
Professional learning community	.155	.402**	.300	.096	.255	-.059	.236	.681**	.437**	1			
Alignment, coherence, and structure	.247	.383*	.353*	.268	.232	.037	.241	.773**	.692**	.667**	1		
Resource capacity	-.118	-.178	-.195	-.050	-.011	-.132	-.073	.172	.366*	-.076	.079	1	
Workload	.640**	.570**	.616**	.568**	.540**	.887**	.880**	.030	.062	.022	.054	-.098	1

Note. $N = 179$.
*Correlation is significant at the .05 level (2-tailed). **Correlation is significant at the .01 level (2-tailed).

and workload were negatively correlated. Although this negative correlation was weak, it was still statistically significant.

RESULTS

The main research questions of our study make up the central focus of this section. We initially report on the results of our effort to classify schools as either moving or stuck before then seeking to determine whether schools located in these categories are distinguished by different patterns of leadership practice and school capacity.

Are There Moving and Stuck Schools?

The first research question challenged us to determine whether it would be possible to classify schools as moving or stuck using empirical data. As described earlier, this involved an analysis of each school's growth trend in student learning across six different subjects over the 3-year period. Consistent with earlier research on school improvement (e.g., Hallinger & Heck, 2011; Willms, 1992), our goal was to see if there were identifiable patterns that differentiated school growth in performance over time.

Figure 1 summarizes the distribution of schools that showed decline, no improvement, or an increase in stanine performance between 2006 and 2008. Results in Figure 1 indicate that about 44% of the schools ($n = 17$) demonstrated consistent improvement, as measured by the increase in their stanine scores over 3 years. The proportion of the Stuck schools was about 56% ($n = 22$). Among the Stuck schools, the proportion of schools without improvement or decline was about 33.3% ($n = 13$), whereas the proportion among schools with declining performance was about 23% ($n = 9$). We also noted that schools demonstrating moderate starting points but rarely high- or low-start points, dominated the declining group. Among schools in the no improvement group, schools with a high starting point were similar in number to those with a moderate starting point ($n = 6$ vs. $n = 5$).

In sum, the effort to differentiate schools according to *changes* in their performance over time appeared to be successful. Employing information drawn from system-level examinations, we were able to distinguish groups of schools that we termed as moving or stuck. This supported Rosenholtz's earlier work and represented the first step in addressing the study's research questions.

Linking School Leadership and Capacity to Performance

Next we examined whether school conditions and leadership practices were associated with improvements. Here the dependent variable in the discriminant function refers to *the school* as a category with two groups (i.e., stuck schools and moving schools). The seven leadership dimensions and six school capacities were validated initially with CFA analyses and then employed as independent variables. The combinations of the predictors were initially grouped separately by their nature (i.e., leadership dimensions or school capacities) and then combined. None of these

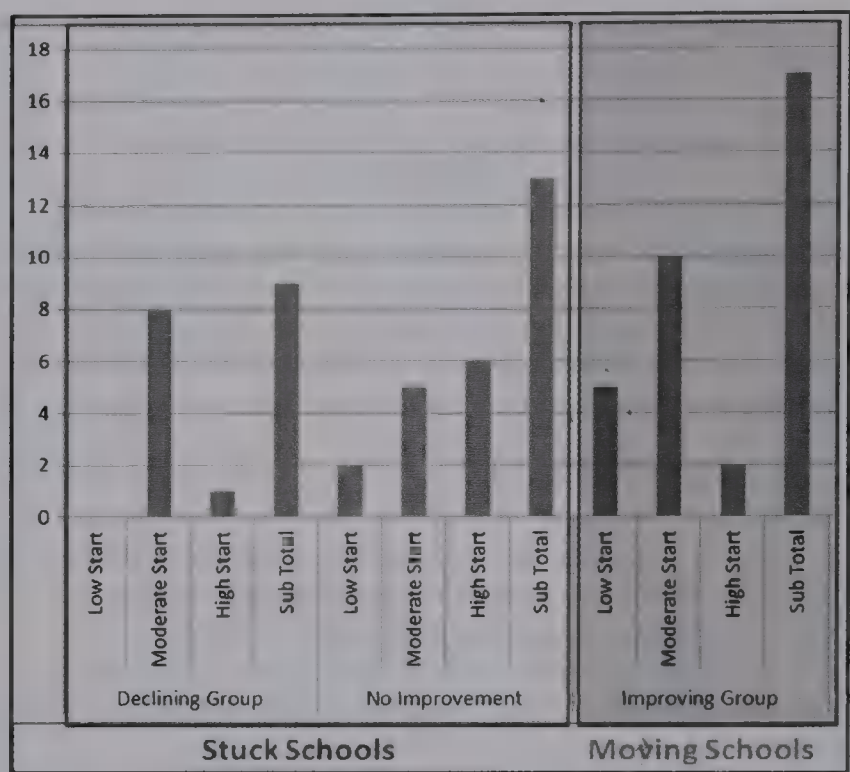


FIGURE 1 Distribution of schools that show declines, no improvement and improvement between 2006 and 2008 (color figure available online).

groups yielded significant results, but individual predictors that showed stronger significances were then selected and combined as a hybrid group.

Table 4 summarizes the standardized canonical discriminant function coefficients matrix and the structure matrix of this hybrid group that yielded significant result. Differences in

TABLE 4
Standardized Canonical Discriminant Function Coefficients and Structure Matrix of Discriminant Function of Best Six Subjects

Leadership Practice/ School Conditions	Standardized Canonical Discriminant Function Coefficients	Leadership Practice/ School Conditions	Structure Matrix
Professional learning community	1.218	Professional learning community	.513
Workload	.772	Workload	.431
Alignment, coherence, and structure	-.718	Resource management ^a	.355
Resource capacity	.576	Alignment, coherence, and structure	.259
Resource management ^a	.231	Resource capacity	.255

^aLeadership practice.

TABLE 5
Tests of Equality of Group Means of Best Six Subjects

School Condition	Wilks's Λ	F	$df1$	$df2$	Sig.
Professional learning community	.910	3.657	1	37	.064
Workload	.935	2.585	1	37	.116
Resource management	.955	1.752	1	37	.194
Alignment, coherence, and structure	.975	.933	1	37	.340
Resource capacity	.976	.902	1	37	.348

standardized coefficients indicate the contribution of each leadership dimension in a particular discriminant function similar to the standardized coefficients in multiple regression. Differences in the structural coefficients suggest the relative significance of the predictors in their relations to a discrimination function (Hair, Anderson, Tatham, & Black, 2008; Huberty, 1994; Huberty & Olejnik, 2006).

We found similar patterns in the standardized canonical discriminant function coefficient matrix and structural coefficient matrix. The hybrid set of predictors associated with this discriminant function comprised four school conditions—professional learning community, workload, alignment, coherence and structure—and resource capacity, and the leadership dimension of resource management (Wilks's $\Lambda = .727$), $\chi^2(5) = 11.008$, $p = .051$. Among these predictors, professional learning community and workload arose as the two most important factors in both matrices. Resource management was the only leadership dimension included within the discriminant function.

Of interest, Table 5 indicates that none of these factors by themselves could significantly distinguish Moving Schools and Stuck Schools in Best Six Subjects. These results suggest that each of these factors by itself are *necessary* but *insufficient* for a school to improve and become a Moving School with respect to performance on the Best Six Subjects.

We were able to reliably predict schools based on this discriminant function at 76.9% for this sample and 64.1% for the population. Moreover, when we removed the last three predictors of the structure matrix, we discovered what appeared to be a trade-off between significance level and the predictive power of the discriminant function. More specifically, the significance level could be improved to $p = .03$ if we kept only the first two factors in the discriminant function. However, the percentage of original grouped cases correctly classified would drop to 61.5% or 59% for cross-validated grouped cases. Thus, we selected the discriminant function that maximized the predictive power of the model while also achieving the minimum statistical significance level.

DISCUSSION

We note that our analysis has a limitation in that we used only value-added stanines of 2 years for comparison. The study may not reflect the trajectories of school improvements accurately because there can be annual fluctuations in value-added stanines for any school. Our selected observation window between 2006 and 2008 may be too short to capture the improvement or the decline of schools at different stages of development.

However, the key finding among those reported in this article lies in the synergistic effect of a combined set of factors that were associated with the classification of a school as either moving or stuck. This reinforces Fullan's (2007) contention that capacity for improvement represents an important target for school improvement efforts. It also supports findings reported by other studies that changes in school capacity are associated with sustainable school improvement (Day et al., 2009; Geijsel et al., 1999; Geijsel et al., 2001; Hallinger & Heck, 2011; Louis et al., 2010; Mulford & Silins, 2003, 2009; Slegers et al., 2002). At the same time, however, it was surprising to find that the only leadership practice that contributed to sustained school improvement did not include dimensions often associated with transformational leadership (e.g., strategic direction and policy environment, leader and teacher growth and development) or with instructional leadership (e.g., teaching, learning and curriculum; quality assurance and curriculum). Although we believe that these leadership dimensions remain important, this study has shifted the focus toward the development of school capacity. A close examination of our set of combined factors shows no contradictions with existing findings on leadership for learning (Barth, 1990; Robinson, Lloyd, & Rowe, 2008) or transformational leadership (Leithwood & Jantzi, 1999, 2005; Marks & Printy, 2003; Mulford & Silins, 2003). Rather, it suggests that an integrated perspective may be required to account for findings in this study as well as others in the literature (Hallinger, 2003; Marks & Printy, 2003).

Another key finding was the role of mediating variables related to the working relationship among teachers in the schools. These included variables such as trust, communication, and professional learning communities (e.g., Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010; Louis et al., 2010). We note that these human variables that describe the relational environment of the school were fundamental to Rosenholtz's (1985, 1989) original analysis of factors that might differentiate moving and stuck schools. This cluster of factors are also crucial for the exercise and development of teacher leadership (Mujis & Harris, 2007) and distributed leadership (Spillane, Cambron, & Pareja, 2009; Spillane, Halverson, & Diamond, 2004).

The fact that professional learning communities was more important than other variables in the determination of schools with significant improvement highlighted the importance of learning-directed professionalism in daily exchanges among teachers. This means that in these schools, teachers are more likely to provide and receive support from their colleagues, discuss possible ways to improve student performance, share best practices with other colleagues, or collaborate with other teachers in the same subject panel. The reciprocal support and learning represented by these communities will enhance the effectiveness of teacher instruction initially and student learning eventually. American (Bryk et al., 2010; Louis et al., 2010; Louis & Miles, 1990) and Australian schools (Mulford & Silins, 2009) have also shown similar findings stressing the positive impact of organizational learning in school improvement. Of interest, we also found that Hong Kong teachers in the moving secondary schools perceived themselves as working harder with a heavier workload. Our interviews did, however, reveal that workload was a misleading term for most teachers because they would often consider other factors like support and recognition from principals, colleagues, students, and even parents as strong extrinsic motivations. This suggests that teachers in schools classified as moving may be motivated to work harder and their hard work is often strongly associated with their principal's emphasis on teaching, learning, and accountability policies in schools.

Our results also highlighted the importance of resource management and resource capacity in school-wide improvement. Resource management was the only leadership practice that

distinguished moving and stuck schools, but of interest, the strength of this leadership practice was not significantly correlated ($r = .011$) to the level of the resource capacity of a school. This means schools with better resources do not guarantee better resource management.

For example, a recent audit report in Hong Kong (Audit Commission, 2010) seriously challenged the local education authority's Direct Subsidy Schools (DSS) scheme for giving too much freedom to schools without sufficient supervisions of their resource management practices. These schools were found to have inappropriate procedures in handling school funds and accounts (e.g., buying properties for expatriate teachers but registering them under the names of the principal and school managers rather than the school) and provide insufficient access and support for students of different backgrounds. Schools under this scheme can collect tuition fees while enjoying the benefits of a government subsidy at the same time. The DSS scheme represented Hong Kong's major accountability policy to promote school choice through privatization of education at the end of the last century.

DSS schools generally have stronger resource capacities than other ordinary aided schools, which must provide their students with a free education. In response, DSS schools issued a criticism of the report, stating that the establishment of the DSS scheme was intended to provide principals with more flexibility in managing resources to pursue students' best interests. The report asks to what extent principals should be allowed to manage extra resources while being accountable for their decisions. It also questions whether the scheme, or perhaps other privatizing education policies in general, may pose a risk to equity. Our findings indirectly support the criticism of the audit report, which states that the DSS schools should be accountable for their lack of access and resources for students from disadvantaged background.

Although resource management is often considered an area of administrative work, its significance in the work of transformational leadership and school improvement should not be underestimated. Resource management may affect a school's compliance with accountability policies as well as teaching and learning. Recently, Smith and Bell (2011) reported that school principals in their study "adopted transformational leadership to increase flexibility and maximise the resources at their disposal" (p. 60). Those school heads reported a strong desire to promote student equality and fairness, especially when developing student worldviews and aspirations. Their finding seemed to be compatible with our finding that shows a weak relationship between resource management and resources capacity in schools. This suggests that a moving school with strong resource management could overcome the limitations in resources to enhance school improvement. Moreover, strong resource management may also result in a more equitable distribution of resources among teachers and among different subject departments (Murphy & Hallinger, 1989).

This was illustrated in qualitative data collected in this study. For example, a principal at one of the moving schools described the change process involved in switching the medium of instruction from Chinese to English. She noted that during the early period of the change she had to reallocate more resources to the English Department when the school was forced to use Chinese medium of instruction like many other schools in 1997. She gradually reversed her resource allocation policy, however, after the Education Bureau (the local education authority in Hong Kong) granted the school the special permission to use English as medium of instruction.

The issue of resource capacity is rarely addressed in most school improvement literature. However, according to Sen's (2009) capabilities approach, the issue of differential resources deserves greater attention. Researchers in England have provided similar evidence (e.g., Muijs, Harris, Chapman, Stoll, & Russ, 2004; Smith & Bell, 2011). Thus, further comparisons between

moving schools of similar background in the future would contribute to our understanding of the dynamics of school improvement in different contexts.

Our results have also confirmed the importance of alignment, coherence, and structure. Creemers and Kyriakides (2008) reiterated the importance of aligning goals, teacher practices, and student outcomes not at the classroom level but also at the school level. We also showed earlier (Walker & Ko, 2011) that the two leadership dimensions of strategic direction and policy environment and leader and teacher growth and development have significant impacts on the school condition of alignment, coherence, and structure.

In closing, we stress that our findings are important for understanding the Hong Kong educational context, as this is the first study using value-added data to look at the longitudinal improvements of two groups of schools. The factors that distinguish the moving and stuck schools in Hong Kong may not be very different from those found in other cultural contexts. The findings of the research suggest that studies of comparative education based on cases would be meaningful as their relevance is now empirically supported. Given our small sample size and limited observation window, we anticipate that more comprehensive and long-term research will enhance our understanding of the trajectories of school development. However, future research is dependent on the availability of data and the schools' readiness to use that data for school improvement.

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Distributed Leadership for ICT Reform in Singapore

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This study examines distributed leadership in Information Communication Technology reform in a government school in Singapore. The study adopts a naturalistic inquiry approach, drawing upon a case study of the aforementioned school for much of its data. The study found that leadership for Information Communication Technology reform is distributed according to functions of transformational leadership, instructional leadership, emotional leadership, and the strategic management of resources. The key enabling factors are an official leadership position, access to expertise, support by senior management, and interpersonal synergies among the leaders. Senior management consistently performs transformational leadership, whereas middle management generally performs instructional leadership. Both senior and middle management provide emotional leadership.

INTRODUCTION

Singapore's first Information Communication Technology (ICT) Masterplan for Education was launched by the Ministry of Education (MOE) in 1997. This was followed by a second masterplan, which was launched in 2002 (MOE, 2006). The main thinking behind the masterplans is that ICT can be used to engage students in active learning, which involves higher order thinking skills and the construction of knowledge. This resonates with Jonassen's (2009) concept of students using ICT as a mindtool to support learning.

Despite the fact that both plans have been in place for about a decade, and Singapore has provided at least \$2 billion (Singapore dollars) of funding to date, an internal scan by the MOE in February 2006 suggested that only 43 schools (12%) were considered advanced users of ICT, whereas 281 schools (79%) were coded as average users of ICT and 32 schools (9%) were coded as basic users of ICT.

A review of literature yielded few studies focusing on leadership for technology reform in schools. Among the studies that reported on the success of technology reform, success is usually defined as ICT's integration into the curriculum and its use to help students construct knowledge (Flanagan & Jacobsen, 2003; Inan & Lowther, 2010). Two key questions remain obscure, however. The first question is, What kind of leadership is required to support ICT reform in schools? The second question is, Is it sufficient for the principal alone to provide the required leadership?

LITERATURE ON DISTRIBUTED LEADERSHIP

Broadly defined, distributed leadership shifts the focus from leadership performed by individuals in specific roles (in particular the principal in a school setting) toward viewing leadership from an organizational or task-oriented perspective (Smylie, Conley, & Marks, 2002). Smylie et al. (2002) provided a good overview of distributed leadership, noting that there were three main models of distributed leadership in the literature.

The first model of distributed leadership, as proposed by Heller and Firestone (1995), views leadership from the perspective of functions performed. Heller and Firestone observed that the same leadership functions, such as providing and selling a vision of change and obtaining resources, are often performed by people in different roles. They observed that there was “redundancy” (p. 65) in the way leadership functions were fulfilled: “Sometimes in a jointly coordinated manner and sometimes with relatively little communication” (p. 66).

In the second model, which views leadership as an organizational attribute, Ogawa and Bossert (1995) argued that leadership occurs not through the actions of individuals but through interactions among individuals. Indeed, Ogawa and Bossert (1995) viewed social interactions between organizational members as the “building blocks” of leadership (p. 236); thus, the unit of analysis is not individual roles but in the network of interactions among different roles with access to different information and resources (Ogawa & Bossert, 2000).

The third model is the model used in this study, because it incorporates the essence of the first two models. The medium of leadership is in social interaction as opposed to individual actions. Spillane and colleagues have argued that leadership is “stretched over” the practice of two or more leaders in their interactions with followers (Spillane, Halverson, & Diamond, 2004); it occurs “in between” people, between leaders, and between leaders and their followers (Spillane, Camburn, & Lewis, 2006, p. 16). Spillane (2006) argued that the influence of distributed leadership is more than the sum of individual leaders’ actions: One leader plus another leader constitutes more than just adding the individual effort of two leaders.

Thus, Spillane et al. (2004) argued that leadership is distributed across an “interactive web of actors [leaders and followers], artifacts [tools] and the situations” (p. 23). People with access to different knowledge and expertise work interdependently and reciprocally to perform leadership activity. Based on such a concept of leadership, the unit of analysis is not individual leaders but leadership activity, which is distributed over multiple leaders, followers, and situations (Spillane, 2005). This possible distribution of leadership is typically found in the school organizational framework as follows.

The principal: With regard to the literature on technology implementation in schools, when leadership is mentioned, it is either stated or implied that this leadership is provided by the principal (Creighton, 2003; Flanagan & Jacobsen, 2003; Kincaid & Feldner, 2002; Martinez, 2002; Ng et al., 2005; Schiller, 2003; Yee, 2000). Although the concept of the lone, heroic principal (Hallinger, 2003) is no longer viable today, it is still important to study the role of the principal in any research concerning leadership within a school context, as the principal remains the school’s Chief Executive Officer.

The vice-principal: Compared to the vast literature on the role of the principal, literature on the role of the vice-principal (also referred to in the literature as assistant or deputy principal) is scarce, perhaps because many view the role as a transition to principalship. The bulk of the studies on vice-principals involved surveys concerning perceptions of a vice-principal’s role in

a school (Bush, 1997; Gaston, 2005; Ledbetter, 2004) or vice-principal's satisfaction with their position (Armstrong, 2004), rather than studies of their enactment of leadership.

Heads of subject departments: Department heads are mentioned both in the literature on middle management (mainly UK-based) and on teacher leadership (Harris, 2003; York-Barr & Duke, 2004). This literature identifies the leadership role of middle managers as important in contributing to and explaining differences in school effectiveness (Brown, Rutherford, & Boyle, 2000; Busher & Harris, 1999). Indeed, Siskin's 1991 study indicated a high correlation between effective schools and the strengths of their departments.

Teacher leaders: Similar to findings on the positive impact of principal leadership, research has shown that teacher leadership is an important factor in achieving both school and classroom improvement (Muijs & Harris, 2003), yet little is known about teacher leadership's impact and enactment process (Kozma & Anderson, 2002; Murphy, 2005). This is particularly true in the case of the literature on leadership for ICT implementation in schools, where the concept of teacher leadership is not prevalent.

In identifying possible sources of distributed leadership within a school setting, the literature provided few operational guidelines on how to untangle this "interactive web" of actors, artifacts, and the situation. To create such guidelines, there was a need to read beyond the literature on distributed leadership, which allowed for a greater understanding of leadership functions, particularly in ICT reform.

Leithwood and Duke (1999), in their study of all those articles published in four major administration journals from 1985 to 1995 that focused on leadership for schools, identified six distinct leadership functions. Of the six leadership functions identified, *instructional* and *transformational leadership* were the most frequently mentioned.

The available literature on leadership for ICT reforms highlights leadership practices that allude to instructional and transformational leadership, although the labels are rarely used. For instance, a consistent theme of research concerned with effective ICT use is the use of ICT to support and improve instruction (Chang, Lan, & Chang, 2010; Creighton, 2003; Kevin, 2009), which is also the ultimate aim of instructional leadership (Blasé & Blasé, 2004; Grubb & Flessa, 2006). Many of the effective technology implementation strategies highlighted by the available literature are also similar to the strategies proposed for instructional leadership: envisioning opportunities for teaching and learning (Sheppard, 2000), providing professional development opportunities (Ertmer et al., 2002), promoting a sense of collegiality (Prain & Hand, 2003), modeling (Baylor & Ritchie, 2002), coaching (Ertmer et al., 2002), encouraging examination of one's beliefs about teaching and learning, and experimentation with new instructional approaches (Hughes & Zachariah, 2001).

Besides instructional leadership, transformational leadership is most explicitly linked to the implementation of change (Leithwood & Jantzi, 2005, 2006). Similarly, a critical characteristic of leadership for ICT implementation in schools is the ability to develop and articulate a vision of how technology could produce change (Kearsley & Lynch, 1992).

In summary, discussions on the role of "the" school leader—the principal—still dominates the literature on leadership. Heck and Hallinger (1999) thus observed a "blind spot" in the research literature in that scholars have largely ignored other sources of leadership besides the principal (p. 141). There is still considerable scope for research that focuses primarily and centrally on distributed leadership in action, and on how schools can create and sustain such leadership (Harris, 2005a, 2005b).

RESEARCH AIM

The objective of the study was to provide insight into the following two research questions:

- 1. How is leadership distributed in a reform involving the use of ICT for instruction?
 - What are the leadership actions enacted?
 - Who enacted these leadership actions?
 - What pattern, if any, is there in the distribution of leadership?
- 2. What factors enable or constrain this distribution of leadership?

METHODOLOGY

As distributed leadership is intimately dependent upon the context and the specific situations present at an institution (N. Bennett, Wise, Woods, & Harvey, 2003; Spillane, Camburn, & Pustejovsky, 2008), this study adopted a naturalistic inquiry approach (Creswell, 2005). This approach involved the case study of a school in the process of implementing a reform that made use of ICT for instruction.

Figure 1 (adapted from Spillane et al., 2004) functions as an advanced organizer to illustrate how the two main methods of observation and interview are related to the theoretical perspective of distributed leadership as well as the three research questions. Table 1 summarizes the main methods used for data collection:

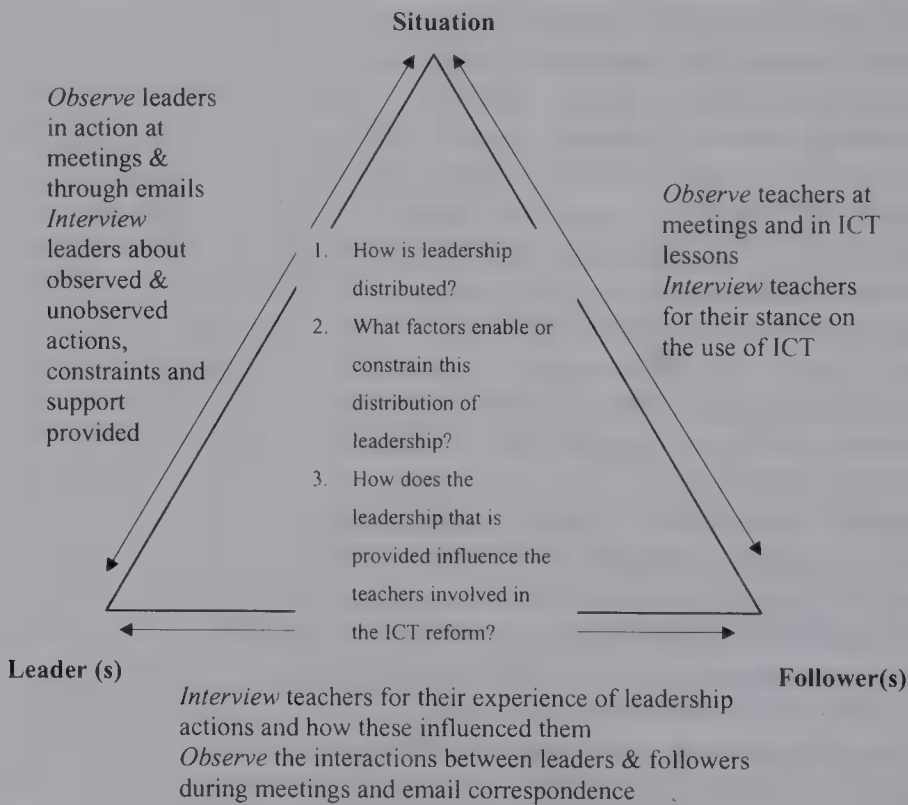


FIGURE 1 Alignment of theoretical perspective, research questions and methodology. *Note.* From “Towards a Theory of Leadership Practice: A Distributed Perspective,” by J. P. Spillane, R. Halverson, and J. B. Diamond, 2004, *Journal of Curriculum Studies*, 36, p. 24. Copyright 2004 by Taylor & Francis. Adapted with permission.

TABLE 1
Methods of Data Collection

Method	Data
Observations	45 timetabled meetings (approximately 1 hr per meeting) 4 meetings involving middle and senior management 6 workshops 14 lessons conducted by four teachers
Interviews	All Primary 4 teachers (including HOD/Mathematics, Level Manager, Subject Head e-learning, and Senior Teacher who were teaching the Primary 4 students) HOD/IT, HOD/English Principal and vice-principal
Artifacts	More than 150 e-mail correspondences Lesson plans and/or digital resources for 14 mathematics topics

Note. HOD = heads of departments.

The research study featured an inductive approach (Patton, 2002) to coding leadership actions. In coding leadership actions, the researchers made a deliberate effort to use gerunds (verbs ending with “ing”) as advised by Charmaz (2006) to minimize the temptation to impose existing leadership functions (usually translated as noun phrases such as “intellectual stimulation” and “individualized consideration”) onto the data. Examples of themes generated in this way include “aligning with the department or school” (Code 1), “planning ahead for sustainability and scalability” (Code 13), and “creating time” (Code 5). It was only after all the data had been coded that the themes generated were compared with the literature to determine how the leadership actions related to existing leadership functions such as instructional and transformational leadership. Comparing this list of generated themes with the literature enabled the researchers to identify some pattern in the leadership distribution.

For the second question, which focuses on factors enabling or constraining the distribution of leadership, codes such as “expertise or formal role” (Code 24) emerged from the attributes that participants—both teachers and leaders alike—associated with specific leaders. For example, Cassie, the senior teacher in charge of the project, was referred to by various people as a “guru,” “role model,” and as spreadsheets and ICT expert.

Although the main analysis method was the constant comparative method of data analysis, researchers also adopted activity theory as an interpretive framework to help make sense of the discrete codes and organize their findings. In activity theory, human actions are performed within an activity system under the motivation to transform some object or some person (Barab, Barnett, Yamagata-Lynch, Squire, & Keating, 2002; Engeström, 1999). The activity system includes the subject whose motivation is to transform an object into an outcome, which can be material or intangible in nature (Issroff & Scanlon, 2002).

Selection of Case

In selecting the school and its accompanying ICT reform, the strategy used to choose the school was based on the concept of purposive sampling, with the aim “to maximize information, not facilitate generalization” (Lincoln & Guba, 1985, p. 202). In selecting one school, the advantage

is that the researcher is able to adopt an in-depth and extensive data collection approach (refer to Table 1). The school chosen for this study, Greenville Elementary, was selected from proposals submitted to the Ministry of Education by 66 schools, each of which had adopted the Lead ICT@Schools scheme at the end of 2006. This scheme recognizes and supports schools that are ready to implement a higher level of ICT use to bring about active learning.

The stated intention of Greenville Elementary's proposal was to use ICT as a Mindtool (Jonassen, 1999), which represents a constructivist approach to using technology. As an illustration, the school intended to transition from show-and-tell activities using ICT tools, like the Geometer Sketch Pad, to activities which would enable students to utilize the Geometer Sketch Pad while working out the geometric properties on their own.

Brief Profile of School

Greenville Elementary is located in a relatively poor neighborhood. Of the school's 1,950 students (2008 cohort), 3.2% live in one- or two-room rented public housing flats. At the senior management level, the school has a principal (Ms. Wong) and a vice-principal (Ms. Liz). The principal was appointed by the MOE from the educational system (primary and secondary schools). A principal typically leads and manages a school for one appointment cycle (6–8 years) whereupon he or she will be assigned to another school.

The school's middle management includes the heads of departments (HOD; Ben Ling as HOD/Mathematics) and level heads, who are the second-line supervisors for specific subjects (Sarah as Level Head/Science). Similar to senior management, the heads of departments are also appointed by the MOE and assigned to schools based on the needs of schools. Besides the various HODs, Greenville Elementary also has a number of senior teachers (ST), one of whom is officially in charge of the Lead ICT reform (Cassie). The post of senior teacher was created as a parallel teaching track to the Ministry's traditional leadership track. The leadership track is "the track for leadership positions in the schools," whereas the teaching track provides "advancement opportunities for teachers who make teaching excellence in the classroom the primary focus in their careers" (MOE, 2006). All staff members are Singaporean. Table 2 provides brief profiles of those staff members who provided leadership for the Lead ICT reform.

FINDINGS

The objective of the study was to provide insight into how leadership was distributed in a school reform involving the use of ICT for instruction.

How Is Leadership Distributed in a Reform Involving the Use of ICT for Instruction?

What Were the Leadership Actions?

It would appear that Greenville's senior management mainly provided leadership for what is referred to as second-order changes, whereas middle management appeared to provide leadership for what is known as first-order changes (Honig, 2003; Leithwood, Jantzi, & Steinbach, 2000).

TABLE 2
Profiles of Leaders

Name	Official Roles	Relevant Details
Ms. Wong	Principal	40 years' experience No experience using ICT as a teacher
Liz	Vice-principal from 2005 to 2007	18 years' experience Previously the Head of Mathematics; explored with her department the use of ICT
Ben Ling (Mrs.)	HOD/Mathematics Took over from Liz in 2005	15 years Familiar mainly with PowerPoint
Sarah	Level Head for Science Level Manager for Primary 4	15 years
Cassie	Senior teacher	28 years Appointed as in charge of Lead ICT reform

Note. ICT = Information Communication Technology; HOD = heads of departments.

First-order changes refer to changes in the core technology of teaching and learning, including the introduction of constructivist models of learning. Research has indicated that an exclusive focus on first-order changes has led to the failures of many change initiatives. Second-order changes are required to sustain and institutionalize first-order changes, as they generally involve changes to organizational structure and cultures, including the effort to distribute leadership (Leithwood et al., 2000).

The modeling of the products involved in integrating ICT into teaching and learning by both Cassie (ST) and Sarah (Level Head/Science) is an example of leadership that influenced first order changes. It was possible for them to provide this leadership because of a second order change initiated by senior management: the introduction of scheduled meetings within curriculum hours, thus circumventing a commonly mentioned first-order barrier to technology use—lack of time. Thus, the study indicates a link between first- and second-order changes mentioned in the leadership literature and the concept of first- and second-order barriers in the literature on technology implementation in schools (Ertmer, 2005).

Who Enacted These Leadership Actions?

In contrast to the literature on technology implementation in schools, which often defines the primary leader as the principal (Flanagan & Jacobsen, 2003; Kincaid & Feldner, 2002), leadership for ICT implementation in Greenville Elementary was distributed among different sources of leadership. The school had an existing basic organizational structure of departments. The principal and vice-principal acted as a bridge between the heads of departments and other middle managers such as Sarah (Level Head/Science) and Cassie (ST), as well as teachers, who were lower on the official hierarchy. This ensured that the department heads, who occupy a “pivotal” position in relation to change efforts in schools (Bennett, Newton, Wise, Woods, & Economou, 2003, p. 3), supported ICT use as a priority. An example of this priority was the communication between the vice-principal and the school’s HODs. The vice-principal frequently

reminded the HODs that they needed to expect to put in more time and effort in the Lead ICT reform.

What Pattern, if Any, Was There in the Distribution of Leadership?

The three broad categories (setting directions, developing people, and redesigning the organization) which Leithwood and Jantzi (2005) used to classify transformational leadership can be used to describe the distributed leadership provided by both senior management and middle management in Greenville Elementary.

Setting Directions

In setting directions, the leadership provided by senior management occurred at the strategic school level, whereas that provided by middle management occurred at the curriculum and project level. This supports the school's overall aim to "get students engaged" (Cassie, September 15 meeting). Although Greenville Elementary's principal and vice-principal have aligned the use of ICT to the school's mission, middle management has focused on aligning the use of ICT to specific subject curriculum and to the more specific instructional vision of ICT as a mindtool for the creation of new knowledge.

Besides making their vision for the use of ICT explicit, senior management also "voiced priorities" (N. Bennett et al., 2003) in various ways, such as indicating that completing the mathematics syllabus was not as important as engaging students in learning using ICT.

Developing People

Instead of the principal personally providing instructional modeling and coaching, as implied by earlier studies on instructional leadership (Blasé & Blasé, 2000; Southworth, 2002) and on leadership for technology reform in schools (Gibson, 2002; Hughes & Zachariah, 2001), the Greenville Elementary's principal empowered others to do so by appointing Cassie, an ST, as the official leader of the Lead ICT reform. The principal also provided a scheduled time for Cassie (ST) and Sarah (Level Head/Science) to meet with the other teacher, allowing them to improve the school's instructional leadership.

Cassie and Sarah focused their attention on equipping teachers with specific technological skills and knowledge (such as how to use a Microsoft Excel spreadsheet and dataloggers), pedagogy (ICT as mindtool, value of using digital mindmaps), subject content, and learning theories. Through a mixture of conventional workshops, on-the-job training, just-in-time "training," and professional feedback, Cassie and Sarah were able to increase the school's comfort with the ICT reforms.

The leadership provided by senior management is transformational and strategic, as it develops the organization's commitment and capacity to innovate. The leadership provided by middle management is more instructional, as it focuses instead on the development of teachers' comfort with the use of ICT. The two leadership roles are mutually interdependent—the leadership by senior management nurtures teachers as learners, which in turn supports teachers in their effort to use practical and innovative ICT strategies to nurture the learning of their students.

Redesigning the Organization and Culture

The original transformational leadership category, developed by Leithwood et al. (2000), focused on modifying organizational structures and on strengthening school culture. This study differentiates between the roles played by senior and middle management in this category. Although senior management retains the official authority to redesign time, physical space, and organizational structure, middle management has the authority to redesign subject curriculum and assessment.

Senior management's redesign of the timetable structure is necessary in order for middle management to provide instructional leadership for the development of teachers' comfort with ICT. The lack of time to exercise leadership is a problem mentioned by many teacher leaders (Muijs & Harris, 2007; Turner, 2003).

Emotional Leadership

Another leadership function performed by both senior management and middle management at Greenville Elementary was what we have decided to label emotional leadership. Emotional leadership, for lack of a corresponding term in the leadership literature, is most closely related to emotional intelligence (Barbuto & Burbach, 2006; Goleman, 2006). Emotional leadership consists of different leadership functions, including individualized consideration (transformational leadership), encouragement and recognition (in both transformational and instructional leadership), presence or visibility (mentioned in instructional leadership and change management), and empathy (in change management and emotional intelligence).

We found that senior management created a supportive culture that communicates care and concern for people as individuals. Senior management also displayed an understanding of the difficulties faced by teacher undergoing the process of innovation and change. The findings suggest that senior management's use of emotional leadership was most significant for teachers, as it contributed to a culture supportive of change.

Strategic Management of Resources

The management and provision of resources is also an important aspect of leadership (Divakaran, 2007; Pate, 2006). Greenville Elementary's principal and vice-principal often approved the use of the school's budget to purchase resources, most of which were recommended by Cassie. Cassie's role in providing teachers with access to working ICT resources was mainly a result of her own effort. She would often try out a lesson and iron out any technical problems before encouraging her colleagues to put a similar lesson into practice. Both forms of leadership provided teachers with access to the necessary ICT resources.

What Factors Enable or Constrain This Distribution of Leadership?

Based on the Greenville case study, we found that the key factors enabling the distribution of leadership include the possession of ICT, pedagogic, or content expertise; an official position

that provides access to resources; the personal working relationships among leaders; and leaders' access to supplemental external expertise.

Division Based on Expertise

Cassie was the key person providing ICT instructional leadership for Greenville Elementary. Although her principal officially assigned Cassie to be "in charge" of the project (Dean, teacher, second interview), she was also a perfect choice, because she had the relevant technological, pedagogical, and content expertise. She was also a very experienced mathematics teacher who had taught all six primary levels, and she had won an MOE award on the basis of her pedagogy and understanding of the value added by ICT. Indeed, the principal explained that they had "identified" Cassie to lead the Lead ICT reform because "she has the theories behind her" (Principal, first interview).

Subject Content Expertise

Sarah's expertise in science was considered important to the school's implementation of ICT in science. Thus Cassie and Sarah shared the leadership responsibilities for implementing the ICT reforms among the teachers. Both women impacted the improvement of ICT-related instruction practices, partly due to the differences in their subject content expertise.

Division Based on Official Leadership Positions

When asked about Ben Ling's role as Lead ICT reform, one of the teacher's reply was revealing:

Ben Ling is more on the Mathematics side, *being the Mathematics HOD*. So I think she *is not so much on the IT side*. She's more, *her area is more*, you see during the discussions, she's always focusing on the concept, the Mathematics, ya, not so much on IT. (Dean, teacher, second interview; italics is researchers' emphasis)

It is interesting how Dean's perception of Ben Ling's role is not so much linked to her content expertise but to her official role as the HOD for mathematics, her position in the organizational hierarchy. Although Ben Ling perceived herself mainly "as a teacher participating" in the Lead ICT reform (second interview), the other tea and senior management saw her main role as the HOD/Mathematics, thereby empowering her to support teachers in their effort to integrate ICT into the school's mathematics curriculum.

Close Working Relations

Evidence showed that the personal relationship between the case study's leaders impacted how and the extent to which they collaborated. It was interesting that Sarah, Level Head/Science used the word "pakat" to explain how she and Cassie had "arranged beforehand" for her to ask Cassie to conduct a lesson for the rest to observe during a meeting (Sarah, first interview). This is a

colloquial malay term that is normally used between children to indicate intimacy and collusion. Cassie confirmed her closeness with Sarah during her second interview, in which she shared that she felt the “two of us are more on the same wavelength, so sometimes we talk about a lot of things before we get it done, yeah and she is more open lah, yeah.”

Leader's Access to Expertise

Cassie's advanced technical expertise also allowed her to translate her vision on how to use ICT to enhance learning into actual ICT learning resources. While developing digital resources, Cassie realized that though she had ideas on how to use ICT to support math instruction, she sometimes lacked the technical expertise to translate these ideas into a digital resource. Without access to advanced technical expertise, she would have been “hampered” in her effort to model the effective use of ICT “so as to provide . . . certain kind[s] of learning experiences” (Cassie to researcher, personal communication, July 30, 2008).

DISCUSSION

Distribution of Instructional and Transformational Leadership

Few studies have examined how different people share the responsibility of instructional and transformational leadership (Yukl, 2001). This study summarizes transformational leadership by identifying which functions have been performed (such as vision and intellectual stimulation). Although Leithwood, Louis, Anderson, and Wahlstrom (2004) differentiated between the effects of leadership provided by different leadership sources, they did not explicate the differences in leadership practices. They did not indicate the differences between transformational leadership provided by people who were at different levels on the chain of command.

Distribution of Leadership Based on Possession of Expertise

One major factor that determined why and how leadership was distributed in Greenville Elementary was the lack of relevant technical expertise. The effective use of ICT requires a combination of different types of expertise: technical expertise, the ability to identify the affordances of a technology tool, the ability to apply a relevant pedagogy, and the ability to apply content knowledge (Staples, Pugach, & Himes, 2005). Although the literature referred to the expertise required by those teachers using ICT, it is arguable that those who wish to lead the implementation of ICT also need to possess such expertise or at least have access to such expertise.

Developing Expertise or Drawing upon External Expertise

Expertise can be acquired over time and thus contribute to leadership at a later stage. This is a pertinent finding because expertise, whether instructional (Hallinger, 2005), transformational

(Leithwood et al., 2000), or distributed leadership (Harris, 2005b; Timperley, 2005), is usually mentioned as an attribute the “leader” already possesses. This study revealed evidence that the leadership provided by some of the participants was enhanced by their access to external expertise. Cassie, for example, drew upon her husband’s technical expertise with Excel to translate her vision for mathematics instruction into reality.

Lack of Expertise as a Constraint

As the possession of expertise can enable the distribution of leadership in ICT implementation, the lack of expertise, particularly technological expertise, can also constrain its distribution. This is consistent with and contributes to the literature’s finding that leaders must possess the ability to model the use of technology (Gibson, 2002; Kincaid & Feldner, 2002).

In this study, there were several examples in which a lack of technological expertise appeared to have constrained the person’s ability to provide leadership. One example is Mabel. The school’s senior management had hoped she would be able to provide instructional leadership on the use of ICT in English, but although Mabel was acknowledged as having expertise in her content area, Liz felt that she was unable to provide leadership for the use of ICT, as it was “not her forte” or her “strength” (Liz, second interview). Mabel lacked both the technical expertise and the ability to identify how she could use ICT to enhance students’ English learning.

Institutionalized Distribution of Leadership

Another major factor that enabled the distribution of leadership in Greenville Elementary was utilization of the school’s organizational structure. This is akin to Spillane’s concept of the distribution of responsibility through the creation of formal structures or official leadership positions (Spillane, 2006). It is contrary to Copland’s (2003) argument that distributed leadership “rests on a base of expert rather than hierarchical authority” (p. 378). Although this study affirms that the distribution of leadership is dependent to a great extent on the possession of relevant expertise, it also suggests that this possession of expertise may need reinforcement by a leader in an official position.

Institutional Hierarchy as a Constraint

The organizational structure can be manipulated to distribute responsibility to more people (Spillane, 2006); at the same time it can constrain the extent to which leadership is distributed (Harrison, 2005; Turner, 2003). In such a schema, programs initiated by the HODs are considered distinct from projects initiated by senior teachers. Those projects initiated by HODs are likely to be considered of a higher priority. As the Greenville principal commented, “The silos, the walls of the silos [referring to department-based silos] are so thick, very hard to break down” (principal, first interview).

Role of Senior Management in Overcoming Hierarchical Constraints

The constraining effect of the organizational structure was partly alleviated through senior management's exploitation of the same organizational structure. Whenever needed, senior management would step in on Cassie's or Sarah's behalf to negotiate with the HODs or to influence the HODs to support the Lead ICT reform by doing "the link ups and talk to the person [HOD], and make sure there was smooth communication and support needed" (principal, second interview). In this aspect, the principal and vice-principal acted as boundary spanners (Coldren & Spillane, 2007) between the HODs and the rest of the middle managers, just as Sarah acted as the boundary spanner between the three subject communities.

Distribution of Leadership Enabled by Interpersonal Synergies

Synergy among school leaders is another factor that can contribute to the distribution of leadership. The organizational structure can be exploited to "distribute" leadership in assigning leadership roles to different people. However, the outcome of "conjoint agency" (Gronn, 2002), in which leaders synchronize their actions with that of their peers, depends on the interpersonal relationships among leaders. Gronn (2002) identified intuitive working relations as occurring when leaders have a close, mutually dependent working relationship. In Greenville Elementary, we observed such intuitive working relations between the principal and the vice-principal, as well as between Cassie and Sarah, largely due to their complementary personalities and similar working styles.

Lack of Synergy as a Constraint

Although there was no hard evidence that differences in personalities or wavelengths constrained the distribution of leadership in Greenville, there was some indication that it might have inhibited more cooperation between the school's leaders. Cassie shared that she did not feel comfortable working with Ben Ling, HOD/Mathematics, due to perceived differences in their teaching and working styles. Although this study suggests that intuitive working relations (Gronn, 2008) could contribute to the complementary redundancy of leadership functions, as Heller and Firestone (1995) discovered, the study also suggests that the lack of close working relations could potentially result in leaders heading in different directions.

Agency

Although institutionalized structures and expertise were important factors in Greenville Elementary's distribution of leadership, we do not wish to claim that people either already possess the expertise required for leadership or need empowerment through organizational structures to perform leadership. Instead, agency plays a key role in the type and amount of leadership displayed. This fact is supported by the literature on leadership (Ogawa, 2004) and on distributed leadership (N. Bennett et al.; Harris, 2005).

Personal Motivation to Develop Expertise

A lack of expertise need not permanently constrain a person from exercising leadership, as seen in Sarah's effort to increase her expertise in the use of ICT. Displaying a refreshingly honest ability to realize that her thinking was "very narrow-minded" (first interview), Sarah pushed herself to explore new ideas and concepts.

Role of Agency in Shaping Structure

As mentioned in the section titled Institutionalized Distribution of Leadership, Greenville Elementary implemented Level Manager structure in its attempt to break the departmental wall. However, it should be noted that simply creating the role of Level Manager might not have been the only contributing factor to teachers developing ICT lessons across subject committees. As Cassie pointed out, it was possible for the Level Manager to "say if English [committee member] you must do English [as in develop only English lesson plans]" (Cassie, October 22).

CONCLUSION

Both the senior management and middle management leadership of Greenville Elementary proved to be interdependent and mutually reinforcing. Important leadership functions were distributed among two main leadership sources, and these leadership functions had impact on one another. Leadership by senior management was critical in enabling and empowering instructional leadership by middle management, whereas instructional leadership by middle management reinforced the strategic direction set by senior management.

Senior management generally performed transformational, strategic leadership at the school level. This resulted in second-order change, allowing for growth in the organization's capacity to innovate. Middle management performed instructional leadership at the project or department level to effect first-order change in teaching and learning. This resulted in the development of teachers' capacity to implement specific instructional practices. Both senior and middle management demonstrated emotional leadership and resource management.

Unlike studies falling into the structure/agency dualism (N. Bennett et al., 2003), which emphasizes structure or agency above the other, this study's findings suggest that the distribution of leadership requires both agency (existing expertise and the willingness to acquire the necessary expertise, interpersonal synergies, internal motivation, ability to empathize and to transpose existing structures and schemas) and structural support (institutionalized positions with its corresponding spheres of influence and the provision of time). The study found that neither of these conditions was sufficient by itself to allow for the true distribution of leadership.

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The Paradox of Power in Leadership in Early Childhood Education

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Western frameworks for school improvement, including the stakeholder model and the model of decentralized leadership, have recently been promoted as solutions for school improvement. Using early childhood education in Hong Kong as an illustrative case, this article focuses on the power and authority of leadership in school decision making. The interview data collected from the two case study schools reveal a paradox of power in leadership that is characterized by tensions between centralization and decentralization in the change process, where decentralization is advocated by policymakers but traditional hierarchical cultures remain. The relationship between the leaders and school stakeholders incorporates a concept of harmony that functions to defuse the potential power struggle embedded in decision making.

INTRODUCTION

Leadership and power are inextricably intertwined. The distribution of power has always been central to understanding the phenomenon of leadership (Gronn, 2002; Harris, 2003; Spillane, 2006). Recently, many developed Western countries, such as the United States, United Kingdom, Canada, and Australia have decentralized education with the aim of creating more stakeholder influence on schools. The stakeholder model has been put forth as an appropriate framework for redistributing influence and power among schools. The basis of this model is the assumption that sharing of power among stakeholders can encourage active participation in decision making and increase student achievement.

In a global context, research on leadership in the West often forms our perception of power and its use. Governments of East Asian countries, such as Japan, South Korea, Singapore, and China, including Hong Kong, have initiated reforms to improve their educational system (Mok, 2006). Looking abroad for promising solutions to domestic problems is an approach commonly used by these same Asian societies (Hallinger, Walker, & Bajunid, 2005). As educational models are culture bound, Western reform movements must be critically reviewed to generate locality-specific knowledge and practice for a particular sociocultural context (Dimmock & Walker, 2000; Tikly, Crossley, Dachi, Lowe, & Mukabaranga, 2003). In this article, I attempt to use Hong Kong early childhood education as an illustrative case to reveal the paradox of power in Chinese preschool settings. Focusing specifically on those schools where local policymakers have pushed for the

Western stakeholder model as a solution for school improvement, I analyze whether Western ideas about decentralized leadership have a place in the early childhood education in Hong Kong.

To provide a context for this discussion, I briefly review the literature on stakeholdership and power. Second, I situate the study within the educational reform effort to improve the quality of early childhood education in Hong Kong. Next, I describe the research problems, research site, and the methods I used. Finally, I present the research findings to support my discussion. In conclusion, I argue that a paradox of power in leadership exists in the Chinese early childhood education context. I state that the Chinese relationship between leaders and school stakeholders focuses on a concept of harmony that serves to diffuse the potential power struggle embedded in the centralization and decentralization dichotomy.

Stakeholdership and Power

Key aspects of school stakeholdership and power are identified in the recent literature within this article. Each of these key aspects is discussed with a focus on its implications for the research problems, which are given in the section that follows.

The term *stakeholder* first appeared in an internal memorandum at the Stanford Research Institute in 1963. According to this definition, stakeholders are “those groups without whose support the organization would cease to exist” (as cited in Kujalà, 2004, p. 561). Stakeholder is juxtaposed with the dominant idea of shareholder in a market economy, where the goal of the firm is to maximize shareowner wealth (Heller, 1997). Freeman (1984) defined a stakeholder as “any group or individual who can affect or is affected by the achievement of the firm’s objectives” (p. 25). The notion of stakeholdership was further elaborated by Ackoff in 1994, who imported a social system perspective into the business field. He argued that enterprises can be regarded as social systems, which are wholes “that cannot be divided into independent parts” (Ackoff, 1994, p. 21). Acting as essential parts to give synergy to the whole system, stakeholders are encouraged to participate actively in decision making.

The stakeholder model gained much of its popularity as a result of a speech given by the former British prime minister Tony Blair, who called for a stakeholder economy in *The Guardian* in 1996. Continental Europe and the Anglo-Saxon countries have now employed the concept in the field of public management. The Netherlands, Finland, and England are useful examples of systems that have adopted a stakeholder model in their educational system. The governments of those countries have changed the patterns of governance of schools to include a wide range of school stakeholders and their interests (Sliwka & Istance, 2006).

Nowadays, the need for stakeholder involvement in educational reform has become a more pressing objective for policymakers around the globe. This effort to reform educational governance can be understood as an external force imposed from the outside on managerial leadership, creating new forms of governance. In a traditional model of leadership, the leader is at the centre of power. In contrast, the stakeholder model relies on horizontal, not vertical, relationships. It invokes a persuasive ideological change in the distribution of power from vertical to horizontal, capturing the spirit of democratic participation rather than central control.

There are implications for the sharing of organizational power that may have a profound effect on the relationship between leaders and stakeholders (Heller, 1997). Indeed, interstakeholder relationships exist that can and do “affect the real and perceived authority of individual stakeholder

groups” (Cohen-Vogel, 2003, p. 8). Theoretically, the notion of stakeholderism embraces open and horizontal relationships based on equitably distributed power, but in practice the interplay of multiple stakeholders makes decision-making situations more complicated (Brazer & Keller, 2006). Therefore, balancing the competing values and interests of various stakeholders is a challenge for today’s leaders (Shariff, 2006).

Power is the ability to influence others toward the outcomes one wants. In an organizational context, it refers to the ability to influence people to accomplish the mission of an institution. Power can be supported by hierarchical structures or conferred on followers. The exercise of power can be understood as an interactive process wherein behaviour is situationally adaptive between leaders and followers (Busher, 2006). When examining the nature of power, the concept of authority must also be considered. Authority is often used synonymously with the term *power*, but they have different meanings to some extent. Power refers to the individual’s capacity to influence and motivate others toward a goal, whereas authority refers to the legitimate right which an organization or group confers on an individual to enable that person to carry out his or her responsibilities (Munduate & Gravenhorst, 2003). In the dimension of legitimate authority, the leader is a person who has power “over” followers. Power, however, can be regarded as a form of exchange between leader and followers, each receiving something from the relationship and each giving. This was described as “power with” by Coates (1997, p. 13). In these circumstances, followers can participate in some of this power, making this a means of resolving the potential conflicts in power relations.

In discussing the bases of power, Barbalet (1985) argued that

Power relations imply acceptance on the part of those subject to them. They also imply resistance. This has been regarded as paradoxical, if not contradictory. . . . Resistance can take different forms, but none are necessarily associated with conflict. What they have in common, rather, is the fact that resistance imposes limits on power. Indeed, it is through its limitation on power that resistance contributes to the outcome of power relations. (p. 531)

His arguments provide insights into the phenomenon of power dynamics.

In recent years, the model of decentralized leadership has increasingly been the object of study in the context of school improvement in Asian countries (Cheng & Tam, 2007; Dimmock & Walker, 2005; Hallinger, 1998). The dimension of power and authority is important in understanding this form of leadership. Much of the Western literature on school improvement has shown that decentralized leadership presupposes a power base that is diffuse and authority that is dispersed within a nonhierarchical collaborative network separate from managerial control (Gronn, 2002; Harris, 2003; Spillane, Halverson, & Diamond, 2004). However, Karlsen (2000) stressed the tension between centralization and decentralization in the process of distributing power and authority. He used the term “decentralized centralism” to describe systems where “decentralization movements from the centre to periphery and centralization movements in the opposite direction will normally lead to tension” (p. 526). His work has shown the complexity of power flow in educational governance.

Moreover, research on school leadership in Asian countries has identified high power distance and collectivism as cultural forces influencing the development of school leadership (Hallinger et al., 2005). This raises questions about stakeholderism’s role as a form of democratic participation in school governance in Asian-Pacific countries, which are often predominated by the ideologies of collectivism and high power distance culture. To summarise, this review of the

literature presents a picture of the complex, dynamic, paradoxical nature of power relations in the discourse of stakeholderism and decentralized leadership.

Hong Kong Early Childhood Education

Over the last decade, the Hong Kong government has moved from a passive to a proactive role in formulating policies for local early childhood education. In the past, the government provided preschools with only minimal support in the form of legislation, finance, inspections, teacher training, and curriculum (Oppen, 1992). The preschool sector has thus been running under conditions resembling the free market. Since the transfer of sovereignty from the United Kingdom to China in 1997, the government has taken a more active role in improving the quality of early childhood education through a number of reform policies, including teacher qualifications, curriculum development, quality assurance, and education vouchers. The central focus of these measures is to raise standards and increase accountability.

The introduction of *Performance Indicators* by the Education Bureau, a local authority, in 2000, is a cornerstone of this quality assurance policy. All preschools are required to make their quality inspection reports accessible to the public. Parents use these reports as a basis for choosing schools for their children. The introduction of reports relating to school performance can be seen as an attempt by the government to exercise indirect control over school quality through parental choice (Ho, 2007a). Thus, the document *Performance Indicators* promotes an ideology of stakeholderism and decentralized leadership, and states that “[school management] works closely with its major stakeholders in formulating policies and developing a proper administration system to enhance effectiveness in management” (Education Bureau, 2002, p. 5). It explicitly recognizes that the involvement of various school stakeholders in the process of planning and implementation of school policies will facilitate the management process. Schools are encouraged to make efforts to promote stakeholder involvement to achieve better student outcomes. Parents and teachers are now regarded as key stakeholders in the local context of early childhood education.

There are two implications for school leadership. First, as mentioned earlier, the provision of preschooling has long been influenced by parental preferences through market choice. With a clear agenda for the involvement of school stakeholders in the decision-making process, reformers now recognize the consumer power of parents. That deepens the impact of market forces on shaping the provision of preschool service (Ho, 2008). More important, the Performance Indicators provide an official channel for parents to extend their power over school policy and operation. Second, a noteworthy feature of Hong Kong early childhood education is a centralized form of leadership. What is being advocated in the stakeholder model set out by the *Performance Indicators* is the creation of a new form of governance at the school level. School leaders are strongly encouraged to involve teachers in decision making, thereby restructuring professional relationships. This could potentially lead to a fundamental change in the distribution of power between school management and teachers.

Research Problems

The research reported in this article is part of a study that seeks to understand the effective leadership practices of various school stakeholders in Hong Kong preschool settings. In the

following, I examine the specific power relationships between the leaders and school stakeholders taking part in the decision-making process of two preschools. I also examine the extent to which a model of stakeholder power pulled from the Western literature is relevant to early childhood education in Hong Kong. Accordingly, I posed two main research questions: How do school principals and different stakeholders perceive the role of power and authority in their school decision-making relationships? What are the conditions that influence the power distribution in such processes?

METHOD

Case Selection

The research objectives stated earlier require a methodology that will generate in-depth data that recognize the role of power and authority in school decision making. As Stake (1995) stated, a case study is “the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances” (p. xi). A qualitative case study methodology was thus used in this study. The main reason for this choice was that the organizational context is important for understanding the complexity of multiple perspectives among various school stakeholders. As the overall purpose of the larger study was to investigate effective leadership’s impact on quality early childhood programmes, I deliberately selected schools from those that the Education Bureau evaluated as excellent. The Education Bureau’s quality assurance inspection covers four domains: management and organization, learning and teaching, support for children and school ethos, and child development. The overall performance of a school is graded at four levels: unsatisfactory, acceptable, good, and excellent. Each year, the Education Bureau evaluates only a small number of preschools as excellent in the inspections. With the assistance of Education Bureau, I was able to identify two preschools that received grades of excellent and were willing to participate in the study.

Description of Case and Context

School A is a nonprofit kindergarten operated by a social voluntary organization. The school was established in the mid-1980s and, along with a number of sibling schools, has been operated and overseen by an experienced coordinator who also serves as school governor. The school is located in a social community building, which was built for educational and social services. At the time of study, the number of students enrolled was 100. School A had nine teachers and four support staff. Among these teachers, four obtained their professional training at the 2-year higher diploma level and five obtained the 1-year certificate. The team of teaching staff was stable. The only example of turnover was one teacher who was internally transferred to a sibling school, requiring the recruitment of a new teacher as a replacement. Eight parents participated in the focus group interviews. Only one of the parents had tertiary education. The remaining seven parents had attained only secondary education. The occupations of the parents were closely linked to their levels of educational attainment. For those who were working, all of them were nonprofessionals. Their occupations included office staff, accounting clerk, and secretary.

School B is a nonprofit kindergarten operated by a religious organization. In operation 30 years, the school is overseen by an experienced coordinator who also serves as school governor. It is located in a private housing estate. At the time of the study, the number of students enrolled was 250. The school principal had more than 10 years of teaching experience and more than 5 years of leadership experience. At the time of the study, she was studying for her master's degree. The school features a team of 15 teachers and three support staff members, each of whom had been serving for at least 3 years. Among these teachers, two had obtained their professional training at the 2-year higher diploma level and 13 had obtained their 1-year certificate. The turnover rate at School B was also very low, as only one teacher was recruited for the new school term. Nine parents participated in the focus group interviews. Two of the parents had tertiary education. The remaining seven parents attained only secondary education. For those who were working, all were nonprofessionals.

Preschools in Hong Kong are heterogeneous in terms of background, educational ideology, operation, size, staffing, staff qualifications, and the needs of their clientele. They have a variety of sponsors including religious organizations, voluntary agencies, and profit-making organizations. The two schools in this study have several common characteristics. Both of them were run by nonprofit organizations. They were operated together with a number of sibling schools by their own parent organization and were overseen by an experienced coordinator who also served as school governor. Both the school principals had received training at degree level or higher and had more than 5 years of experience. Meanwhile, most teachers had obtained only their professional qualification of 1-year basic certificate, though some had a higher diploma. The school principals had relatively higher qualifications than their teaching staff. Comparatively, the gap in professional qualifications of staff at School B was bigger than at School A. Both schools had a stable team of teachers who had been serving for at least 3 years. Seventeen parents were interviewed in this study, 14 of whom had received secondary education. The educational attainment of the other three was at the tertiary level. None of the parents were professionals.

Participants

The stakeholders in this study were defined as those individuals with a vested interest in their preschool's programme quality. In each case study school, I interviewed the coordinator (i.e., school governor appointed by the parent body), principal, one senior teacher (if any), one class teacher of each cohort, one subject or special education teacher (if any), and half of the support staff. Two parent groups were also selected for interview. Parents of students 5 to 6 years old and those of graduates (6- to 7-year-olds) were selected for interview. The children of these parents had been or were going through the whole schooling process. It can be anticipated that these parents had a good understanding of the operation of the school and its recent changes. The composition of participants is listed in the table in the appendix.

Data Collection and Analysis

Interviewing was the major method of data collection for this study. Interviews can be divided into three categories: structured interview, semistructured interview, and unstructured interview

(Fontana & Frey, 2005). Each category varies in format and structure of questioning. Semistructured interviews lie in between structured and unstructured interviews in terms of the flexibility of the interview process. For semistructured interviews, the interviewer prepares a list of open-ended questions, from which the interviewer has some space to adjust based on the flow and context of the conversations. This study featured semistructured interviews as a data collection method because this type of interview is more systematic than the conversational interview and less restrictive than the standardized open-ended one (Mukherji & Albon, 2010). It allows the interviewees to express their opinions and describe their experiences in a more relaxed and spontaneous way. It can therefore generate a depth of understanding that is appropriate for the objectives of this study. That is to investigate the multiple perspectives on power and authority in decision making held by various school stakeholder groups and the interactions between school leadership, in-school processes, and school context. Interviews of the school governors, school principals, teachers, and support staff were conducted on an individual basis to allow each participant the opportunity to express their views openly and confidentially. The parent interviews were conducted among focus groups of three to five people. All interviews were conducted by the researcher. All participants were interviewed for one session, and each interview ranged from 60 to 90 min. The interviews were audio-taped and fully transcribed. The study used Attride-Stirling's (2001) thematic model to conduct the data analysis. NVivo, computer software for qualitative analysis aided the data coding. Codes were applied to the text to dissect it into segments. After completing this process, all interview transcripts were reread for a second time to ensure consistency of categorization across transcripts. Categories and themes subsequently emerged from the interview transcripts.

FINDINGS

In this section, I discuss the views of various school stakeholders concerning the power relations inherent to leadership roles and how those same stakeholders perceived the role of power and authority in the process of decision making. I also discuss the conditions that influence power distribution in such processes. Based on these findings, the next section addresses the issues of power and leadership.

Participation in Decision Making and Degree of Power Control in Delegation

I used two interconnected dimensions, namely, boundaries of participation in decision making and degree of power control in delegation, to discuss the power relations between the leaders and school stakeholders in the process of school change. In this regard, two definitions support my analysis. Duke, Showers, and Imber (1980) stated that "school decisions are greater than a particular classroom, but not greater than a school including nine areas: instructional co-ordination, curriculum development, staff development, evaluation, general school improvement, personnel, rules and discipline, general administration, and policymaking" (p. 26). McKenna (1998) defined delegation as the act to "designate decision-making authority and task responsibilities to appropriate staff; effectively use their times, skills, and abilities and potentials" (p. 108). I used these two definitions as the theoretical framework for the following discussion. In this study, both school principals limited their staff's participation in decision-making processes to the areas of

curriculum and pedagogy. The principals also made some degree of power control by delegating to their teachers. However, the delegation itself was different in nature between the two case study schools. With reference to McKenna's definition, Principal A designated task responsibilities and some decision-making power to her staff, whereas Principal B mainly focused on delegating task responsibilities. Thus, Principal A exhibited less power control than Principal B.

I do not participate in the staff meetings. I think the teachers can express their opinions more freely [if I am not there]. Except for matters of emergency, I won't give them an agenda and guidelines. This is to give them a free hand to work things out. (Principal A)

The description provided by Principal A was consistent with what her staff told me. Teacher B said that Principal A chaired the meetings at the initial stage of the change. She gradually withdrew in the later stages, pushing the teachers to take turns to holding the meetings and leading the discussions.

Because Principal A intended to delegate some authority and give autonomy to her staff in the leadership process, her subordinates reciprocally found themselves with more power to take up the lead role in implementing the curriculum change. Teacher C cited the coordination of the science curriculum:

The outside experts visited our school to teach us the subject knowledge and teaching skills in conducting science experiments with the children. . . . Afterward, I had to compile the information and share it with other teachers. I taught them how to conduct science experiments. I found myself acting like a leader in the process. (Teacher C)

In contrast to the situation at School A, Principal B delegated only the task responsibilities to her staff, not the embedded power and authority. In return, the staff of School B tended to conform to the authority of the school management. Two teachers described the process of decision making in the following terms:

When Principal B has a new idea, she will not order us to follow her direction immediately. She usually tells us to make a trial. After she has observed the process for a period of time, she discusses with us. Whether our suggestions are accepted or not all depends on her final decision. (Teacher J)

Effective communication between a principal and the teachers is very important. Every week, we have the staff meeting with Principal B to facilitate the communication between us. It is difficult to work things out if we don't understand the thinking of Principal B. (Teacher G)

Market theory assumes that the two schools in this study actively involved their parents in decision-making processes. The reason for this is that "output closely links to service demand and quality is defined by the consumers in a private market" (Shaw, 2000, p. 57). This assumption implies that the power and influence of consumers significantly determines the running of an organization responsive to the market. In line with this assumption, the interview data suggested that both principals made considerable efforts to collect parents' opinions on the orientation of the curriculum and pedagogy, the effectiveness of teaching and learning, and school activities. They also provided parent education through various channels, such as parents' meetings, daily conversations, telephone calls, newsletters, and opinion surveys.

Basically, I conduct opinion surveys for each school activity. Some are closed questions and some are open. The survey is to provide an opportunity for parents to express their views. (Principal B)

The schools took actions to follow up on parents' opinions thoroughly. Parents consistently echoed this fact. Parent D told me that she gave suggestions on the choice of curriculum content to the school. After consideration, School B accepted her opinion.

Many investigators have concluded that encouraging participation in decision making can increase the probability of change in organizations. However, some argue that no control in participatory decision making may be just as damaging as no participation at all (Lammers, 1967, p. 213). The aforementioned examples indicate that parents participated actively in the process of decision making and the schools valued such participation as an input for planning their educational service. But still, the boundary of participation was limited to school activities and the area of curriculum and pedagogy. For example, Principal A said the school management did not have any plans to involve parents in decision making at school policy level. This indicated that the boundary for parents' participation in decision making was well defined by the school management.

Relationships in Harmony

These findings on participation levels in decision making and the delegation of power prompt me to raise another important question: How does management lead the staff in ways that enabled them to become, as I term it, "restricted autonomous followers" without leading to a power struggle between the leader and school stakeholders within the school context? Data from this study suggest that a harmonious relationship is the answer. Similar to the organizational paradox phenomenon described by Moos (2003), the relationship among all school stakeholders was twofold. One was social and the other was a working relationship. Each of these is explained in turn next.

Characterised by caring and trustfulness, a strong social relationship was enjoyed by all stakeholders, thereby constituting a positive school culture and atmosphere. The school principals made considerable efforts to build up a network of good social relationships within their schools. Teacher E of School A mentioned that the school principal and teachers were open about their personal life, just as they would be with friends. This was echoed by a member of the school's support staff. She said that Principal A was very kind to each of them. The following excerpt given by a parent of School B highlighted the good relationship between Principal B and her staff:

Principal B knows that the teachers are very hardworking and responsible. They try their best to serve the children and their families. She can put herself into the shoes of teachers as she was a front-line teacher many years ago. Principal B often has a social gathering with her staff after school. It seems that they enjoy each other's company very much. (Parent C)

Another parent in the group interview also mentioned that Principal B valued the school's strong social relationships.

For example, Principal B invited the volunteer parents and all staff to the celebration party after the school graduation ceremony last year. She took the opportunity to thank each of us. We all enjoyed the party very much. Principal B stayed for the whole night. She would not just pay the money for the party and then leave us alone. (Parent C)

At the same time, the school principals and the stakeholders had a close working relationship. The principals were very willing to offer help to their staff whenever needed. Principal A said she would not mind working with her staff on trivial things. For example, she helped the staff wrap gifts for the school graduation ceremony. This helpfulness and supportiveness was consistently mentioned by teachers, support staff, and parents. Next is the experience of Teacher G in her own words.

I know Principal B is very busy with the school matters. No matter how busy she is, she always maintains close communication with me. For example, I have a few cases of children with learning difficulties. She always asks if she can offer me any help and support. (Teacher G)

I use the metaphor of “buffer” to describe this long-term, harmonious relationship, as it functions to lessen the effect of the centralization and decentralization dichotomy. As Dimmock and Walker (2005) argued, leadership in East Asia is mediated by important cultural norms of high power distance, a collectivist orientation, and hierarchical compliance, where the cultures “continue to place a premium on collectivism and group harmony, it is more accepting of societal and organizational power inequities” (Dimmock & Walker, 2002, p. 78). Similarly, this study’s school stakeholders were quite satisfied with the present distribution of power. That is to say, the centralized power and authority held by a single head was uncritically accepted by the school stakeholders.

SUMMARY

In general, the exercise of school leadership within the two case study schools was highly centralized. However, participation in decision making and the delegation of power operated differently to some extent. One principal extended less power control in delegation to her subordinates, whereas the other imposed more restrictions on the exercise of power and authority. On the whole, the two principals limited the delegation of power, whether it was power and authority or task responsibilities, to the scope of curriculum and pedagogy. For parents, the boundaries of participation in decision making were not as confined as those for the teachers, but they still did not extend to the school policy level. The role of school leadership was centralized on the principal herself. The school stakeholders in this study often used the terms *headship* and *leadership* as interchangeable concepts. And yet, the school stakeholders uncritically accepted the centralized power and authority exercised by the school management. Harmonious relationships established and maintained by the school principals functioned as a buffer to release the tensions and power conflicts embedded in the decision-making process.

DISCUSSION

The introduction of *Performance Indicators* in 2000 imposed new demands for the involvement of various school stakeholders in the school decision-making process. The *Performance Indicators* also began a change toward decentralized leadership. This study examined the extent to which power sharing between the leaders and school stakeholders has produced a more equal relationship and reshaped preschool leadership. Though the results of this study cannot be generalized for the

whole picture of school governance and leadership phenomena in early childhood education in Hong Kong, it does shed some light on the latest developments.

I observed some differences where a centralized style of leadership dominated. The leading practice of one principal was centralized, with very limited scope for delegation and participation, whereas the second principal exhibited a higher degree of power sharing, which allowed for greater participation in school decision making among various stakeholders. Based on the limited evidence provided by these two case studies, I argue that the development of preschool leadership has just begun to shift toward decentralization. Some tensions may occur in this process of decentralizing leadership. In this section, I discuss the paradox of power in leadership in the local preschools by making reference to the work of Karlsen (2000) and also that of Hallinger et al. (2005) on power and leadership.

The mentality of school principals and teachers lays the foundation for later discussion. Through 1997, early childhood education was characterised by poor quality services with minimal professional training. Many perceived the field as custodial care or preparation for primary education (Oppen, 1992). Preschool teachers who had received no professional preparation were practicing in the schools until the implementation of a preservice training policy in 2003. Most of these teachers were originally “trained” in a modified form of apprenticeship. They tended to follow the practices of the experienced members of staff they worked alongside. They were expected to respect formal authority and not challenge the power held by those in senior positions. These experiences led them to be “professionally” socialized (Ho, 2006). School principals’ and teachers’ perceptions of power and authority mutually reinforced a patriarchal social structure. High power distance culture is thus deeply rooted in the profession.

Performance Indicators advocate models of stakeholdership and decentralized leadership. Power sharing is a common characteristic of these models. Originally developed in continental Europe and Anglo-Saxon countries, these models would prove problematic if adopted in Chinese preschools without critical consideration of the differences in cultural context. Although the quality assurance policy encourages both greater participation by various stakeholders in school decision making and promotes decentralized forms of leadership as mentioned in the previous section, it also implies that harmonization plays an important role in the development of stakeholdership in school governance. The document states,

The management of the pre-primary institutions is visionary, capable and knowledgeable. They administer and develop the institution in an open and harmonious manner with great devotion. They have a good understanding of various changes and can lead the institution towards quality education through concerted efforts. (Education Bureau, 2002, p. 5)

The policy document itself is a useful example of a manifestation of the paradox of power in school governance. It implicitly recognizes the problematic nature of stakeholdership in local preschools. Influenced by the high power distance culture, school leaders utilize harmonization to reduce the tensions embedded in the dilemma presented by centralization and decentralization.

This study indicates how two school principals can use the establishment of stakeholder power relations to guide change on a daily basis. The study also suggests that leadership practices can be shaped by how the presence of harmonious relationships. I do not wish to argue that harmonization should not be used as a means to achieve stakeholder relations for positive school culture, but an important challenge remains for a modern preschool leader—how to go beyond harmonious relationships to develop a form of democratic participation in the decision-making

process. The purpose of such participation is to establish checks and balances on the absolute power and authority of school leaders. These checks and balances ensure that school policies are fair and can be applied equally to all members of a school. The concept of social equality is important to the ideology underlying the democratic movement towards stakeholder involvement. Social equality in schools is important if education is essentially a moral enterprise.

CONCLUSION

The theoretical and conceptual contributions of this article fill an important gap in the power and leadership literature. By explaining the power relations and dynamics of multiple school stakeholders in a Chinese early childhood education context, this article asks questions about the distribution of in-school governance. This is a setting where decentralization is being discussed, but where traditional hierarchical structures remain. This article addresses the paradox of power in leadership, in the process pointing out the centralization and decentralization dilemma inherent to the process of school change. Empirical evidence from this study suggests that leaders in Chinese early childhood settings experience conflict over leadership roles, holding traditional views that a leader should take responsibility, at the same time as they are encouraged to move toward the development of decentralized leadership. The involvement of school stakeholders and decentralizing leadership practices will succeed in changing the top-down leadership values and behaviour if, and only if, leaders and school stakeholders can go beyond harmonious relationships and move toward democratic participation, thereby ensuring that all voices are heard in the formulation of school policy.

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APPENDIX

TABLE A1
Composition of Participants

Role of Participants	School A	School B
School governor	1 person	1 person
Principal	1 person	1 person
Senior teacher	NA	1 person
Teachers		
Class A (2–3-year-olds)	2 teachers	NA
Class B (3–4-year-olds)	2 teachers	4 teachers
Class C (4–5-year-olds)	2 teachers	3 teachers
Class D (5–6-year-olds)	2 teachers	3 teachers
Subject teacher	1 teacher (Special education)	1 teacher (English)
Support staff		
Clerical staff/Housekeeper	4 workers	3 workers
Parents of students of Class D	5 parents	4 parents
Parents of graduates (6–7-year-olds)	3 parents	5 parents
Total	11 interviews	11 interviews

Note. Source: Ho (2007b).

Understanding the Ecologies of Education Reforms: Comparing the Perceptions of Parents and Secondary Teachers and Students in China

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This study examines how secondary school teachers have implemented educational reforms in China. To examine the implementation process, we conducted teacher, student, and parent surveys. Teachers and students surveys asked questions on how often a teaching or evaluation strategy was used in a given course. The survey concluded that teachers and parents liked the reform initiatives, although some teachers still struggle with the transition to the new reforms, most were able to make the necessary changes to include some student-centred lessons. However, students claimed that teacher-directed lessons still dominate most classrooms and tests, class work, homework, and exams are still the most common evaluation systems. The surveys also revealed that classroom management needs increased attention as a result of the reforms. The largest problem, however, lies with the examination systems, as there is currently little room for introducing activity-based learning. Parents and society need to change their mind-sets of valuing examination achievements.

INTRODUCTION

In the 1990s, large-scale education reform orchestrated by provincial, state, or national governments emerged around the world (Fullan, 2000). Whitty, Power, and Halpin (1998) studied such reforms in Australia, England, New Zealand, Sweden, and the United States. Each country had its unique history and context, but all of the governments introduced policies that sought to reformulate the relationship among government, schools, and parents, all while developing closer links between objectives, programmes, teaching, and student evaluation.

Education reforms, such as the changes of the 1990s, often challenge classroom teachers (Fullan, 2000; Sowell, 2005). Teachers initially report feeling overwhelmed and undersupported (Helsby, 1999; Joong, Ying, Lin, & Pan, 2006, 2009; Lasky & Sutherland, 2000; Ryan & Joong, 2005; Soucek & Pannu, 1996; Taylor, Rizvi, Lingard, & Henry, 1997). These feelings result because changing the curriculum and the resultant pedagogical transition require teachers to alter the “specific blueprint for learning that is derived from the desired results—that is, content and performance standards” (Wiggins & McTighe, 2006, p. 6).

Educational reforms can also increase tensions. As outcomes are measured and results are evaluated against standards, they can trigger resistance, debate, and passivity. Teachers do not actively resist change, they simply resist the transitions required by change. Transitioning to new theories and curricula requires teachers to deviate from tried and true lesson plans, activities, and assessment modes to move into a new reality (Sowell, 2005). This is a difficult and important transition, especially considering teachers' key role as agents of change who work directly with students (Clarke, 1997; Fullan, 2001). Fullan (2000) explained, "We need to first focus on how teachers make sense of the mandates and policies because there will be no educational reform until after teachers interpret the policies and make decisions based on their beliefs about the new demands" (p. 12). We must also pay attention to the influence of reforms on students (Earl & Sutherland, 2003). We cannot deny the credibility of students as expert witnesses of effective instruction.

Recommendations from the National Association of Secondary School Principals' (2004) *Breaking Ranks II: Strategies for Leading High School Reform* suggest that listening to students can be an effective strategy for school improvement. The report also encourages teachers to use a variety of instructional strategies. Fullan and Stiegelbauer (1991) posed the question, "What would happen if we treated the student as someone whose opinion mattered in the introduction and implementation of reform in schools?" (p. 170).

What about the voices of parents? Do their opinions matter? According to Ma, Lam, and Wong (2006), in China, most parents have only one child in the family and "it is simply natural that they expect their only child to enjoy high-quality education" (p. 210). The objective of this study, therefore, was to investigate the perceptions of teachers, students, and parents on the implementation of education reform in China.

China has, for a long time, adopted a centre-periphery curriculum development system. Virtually all schools follow the national curriculum (Ma et al., 2006). For more than 3,000 years, the curriculum demanded that students study the same material, memorizing texts and taking examinations in a manner that conformed to a prescribed style of written argumentation within the Confucian tradition (Armstrong, 2003). In 1999, however, the Chinese Department of Education introduced its "quality education" reform in pilot schools. The *Basic Education Curriculum Reform Outline* (2001) laid out the blueprint of the reform for the whole country (Lui & Qi, 2005), in the process attempting to introduce three curricular transformations—from "centralized" to "decentralized" curriculum policy, from "scientific discipline-centered curriculum" to "society construction-centered curriculum," and from "transmission-centered teaching" to "inquiry-centered teaching." The reform goals, as stated in a recent Ministry of Education (2010) document—*For the All-Round Development of Every Student: China's Curriculum Reform of Basic Education in the New Century*—are "students should be urged to take an active part in learning activities" and "[students] should also develop their abilities to collect and process information, acquire knowledge, analyze and handle problems, [and] communicate and cooperate with others" (p. 3).

According to Liu and Qi (2005), this reform required major changes in Chinese schools. The reforms emphasized curriculum content, student understanding, and application of concepts. In classrooms, special attention was aimed at each Chinese teacher's use of varied teaching and learning methods and his or her application of a variety of assessment modes (Liu & Qi, 2005). There was intense pressure to cater to individual differences and to promote generic skill development and high-order thinking over rote learning (Zhong & Cui, 2003). These changes

required extensive pedagogical transitions, as traditional modes of teaching, predominately teacher directed, had to be replaced by a variety of new modes of instruction.

Educational Significance

Educational transitions involve human, personal, and political factors. Human factors include teachers, students, and parents, each of whom make a difference in the efforts to successfully implement school reforms. Personal factors include such elements as philosophy, values, and social and ethical orientations. Educational change efforts are reflective of political pressures as well, including government ethos, rationalization, flexibility, and budgetary support. As has been shown elsewhere (Levin, 2000), educational leaders in both China and other jurisdictions should pay close attention to both the human and personal factors involved with reform.

Despite China's emergence as one of the world's most influential economies, other countries know relatively little about China's educational system, mainly due to restricted access and language barriers. This study seeks to address this issue by shedding some light on recent education reforms in China. Insights into how Chinese students learn and Chinese teachers teach could affect future changes in the policies and practices of China, as well as other countries. This study also reveals some of the Chinese parents' most pressing school concerns. Even though they are only consumers of the education process and not implementing agents, their voices ought to be heard.

Objectives

This follow-up research was undertaken to examine parents', teachers', and students' perceptions of the secondary reforms in China. Topics studied include curriculum planning, teaching strategies, assessment and evaluation strategies, special education programmes, high-stakes examination, sex and gender attitudes, and parental involvement. This study builds directly upon the findings of a previous study conducted by the same principal investigator (Joong et al., 2006, 2009) with 16 sample secondary schools in Guangxi Autonomous Region in southwest China. The current study, conducted 4 years after the conclusion of the previous study, includes a new data set and involves 24 sample schools from four regions of China.

Literature Review

In 1999, China introduced "quality education" reform via the introduction of a new curriculum, a new student-centered approach to teaching and learning, a new focus on vocational schools, and a new special education program. According to Chen (2002), Chinese classrooms are usually teacher centered and very structured, with students acting as passive learners. Chinese education tends to emphasize book knowledge rather than practical ability. Because of the focus on examinations, all teachers have the same syllabus and must follow it. Recently, however, China has attempted to change this rigid situation through curriculum reform. Chen (2002) concluded that Chinese teachers must learn how to teach students in different ways and adapt some of

the strategies used in the West, for example, activity-based learning. New textbooks and syllabi have thus been developed, new assessment and evaluation modes have been introduced, and increased flexibility has been granted to local schools. In-service workshops are now offered to teachers. Teachers have been challenged to discover how to incorporate new methods while still maintaining the strength of Chinese education. Chinese secondary schools are divided into junior and senior levels. Graduates at each level wishing to continue their education take an entrance exam, which in China is the National College Entrance Examinations. It has long been the goal of Chinese students to pass this examination (Feng, 1999). In the Chinese context, high-stakes exams such as these affect teachers' curriculum decisions (Zhang & Ren, 1998). The effect of exams on teachers' practice is very strong, as exam results have a significant impact on students' future. Teachers feel that they have the responsibility to help students find success on these exams. Zhang (2004) stated that the solid tradition of exam-oriented education of acceptant learning had affected courses, teaching methods, teacher–student relationships, and the system of evaluation and selection. Huang (2004) recommended that “teachers need to make favorable conditions for learning by experiments. This includes making good use of facilities, stimulating students' creative abilities, support cooperative learning, and use diversified evaluation” (p. 8). Due to the conflict created by China's reform of traditional schools and the unchanged university entrance exam, it remains doubtful whether “quality education” efforts will be successful. Zhang (2004) also claimed that there is little research on “quality education” in China and “it is very important to carry out the overall and predictive research on reform and development of basic education in China” (p. 12).

On a positive note, Cheng (2004) from the University of Hong Kong claimed that research has shown widespread changes in Chinese teaching practices. Sample changes include a “return the time to the students,” which advises teachers to talk less and allow students to do more, and a call for “multiple answers to a question” and “multiple solutions to a problem,” which changes the teachers' roles in the classroom. China also has an active system of continuous professional development that includes frequent local meetings, demonstration lessons by experienced teachers, satellite TV networks for rural schools, a culture for “the best method,” and strong education reform leadership (Cheng, 2004).

Methodology and Data Collection

This study is made of two different research methods: administration of questionnaire surveys and classroom observations. One major source of data for this study was surveys of teachers, students, and parents. Given that recent Chinese reforms are designed to change how and what teachers are teaching in the classroom, the study also utilized survey data measuring instructional effectiveness. Surveys are also commonly used to measure the implementation of large-scale reforms and how often certain strategies are used (Desimone, Smith, & Frisvold, 2010). The questionnaires for teachers and students used a 5-point (Likert) scale to indicate how often a teaching or evaluation strategy was used in a given course. The parents' survey contained questions pertaining to the “quality education” reform in China. The researcher modified older questionnaires, which were used in previous studies (Joong et al., 2006, 2009) for this research. Each questionnaire was field-tested at a secondary school to ensure that respondents understood and could complete all items as expected. This test–retest method allowed for the refining of all aspects of the data

collection package, particularly the questionnaire items, facilitating easier reading, interpretation, comprehension, and completion. The closed-ended items were scaled on a continuum from *never* to *always* and numbered to develop response frequencies, and the researcher content analyzed the open-ended items. Classroom observations of curriculum materials, teaching, and assessment strategies used were carried out at four sample schools, mainly for triangulation purposes.

The population, from junior and senior secondary schools in four provinces (Guangdong, Guangxi, Shangdong, and Hubei), included 24 sample schools that were selected to represent large and small urban cities, as well as the many ethnicities and socioeconomic status backgrounds (based on income levels—high, medium, or low) in China. To facilitate access and ensure fair representation, the researchers selected each sample school through convenience sampling. Sample schools included 20 academic schools and four vocational/technical schools. At each sample school, 25 randomly selected sample teachers and two representative classes (100 students) were asked to complete separately designed questionnaires. The return rates for questionnaires were 82.4% (students), 84% (parents), and 69.7% (teachers).

RESULTS

Parent Voices

Parent surveys were only distributed among the six sample schools in the Shangdong province (south of Beijing). Of the 503 parent respondents, 53% were male and 47% were female. Their occupations included professionals (58%), small business owners (23%), farmers (7%), business owners (4%), and unemployed/retired (8%). The self-ranked socioeconomic status of parents included high (2%), medium (68%), and low (30%). Educational backgrounds included primary (41%), junior secondary (32%), senior secondary (8%), college (16%), and postgraduate (3%).

Satisfaction With Curriculum and Teaching

Of the parent respondents ($n = 499$), 61% were satisfied with the curriculum, 5% were not, and 34% were in-between. Respective results for satisfaction with teaching were 55%, 5%, and 40%. Most of the parent respondents (68%) claimed that the schools have enough resources, such as books and computers. When parents were asked what areas need improvement, their top responses were use of new resources/computer technology (51%), improvement of teaching strategies (47%), classroom management (42%), curriculum planning (27%), and student evaluation strategies (24%).

Curriculum Reform

Parent respondents were given a list of reform initiatives in the schools and asked to rate their level of agreement on a 5-point Likert scale. Results are in Table 1. When asked about their satisfactions with the current reforms, 61% of the parent respondents ($n = 499$) were satisfied with the reforms. It is clear that parental involvement was high in the sample schools.

TABLE 1
Parents' Perceptions of Reform Initiatives

	Agree	Disagree
Parents and teachers support and encourage each other	78%	7%
School encourages parents to make suggestions for improvements	73%	7%
School administrators and parents support each other	78%	7%
School has enough resources to undergo new educational reforms	66%	14%
School goals are designed to improve curriculum and teaching	70%	7%
School finds the right balance between the number of changes	59%	10%

Note. *n* = 466.

Opinions on Examination System and Dating

When asked for their opinions on the examination system, 30% said the current system is unsatisfactory (*n* = 466), 23% said satisfactory, and 47% said in-between. On the issue of their children dating while in school, only 14% said it is not good, 31% said it is okay, and the rest were in-between.

Teacher Voices

Sixty-nine percent of the 294 teacher respondents were female. Mean teaching experience was 15 years. Ninety-two percent were trained teachers with university degrees. Ethnic groups were mostly Han (93%) and Zhuong (5%). Sample teachers were well represented in different subject areas and grade levels. Mean class size was 51, but teachers preferred a size of 29. According to the teachers, student socioeconomic status included low (37%), middle (53%), and high (10%).

Curriculum, Teaching, Assessment, and Evaluation

On average, respondent teachers spent 15 hr each week preparing for their classes. A majority (77%) of the curriculum materials used by respondent teachers were national, with 20% were provincial. A majority (70%) claimed that the current curriculum was good, whereas 2% claimed that it was poor. Most teachers claimed that they received sufficient resources (67%) and sufficient professional development (63%), which represents a dramatic shift from the results of the previous studies (Joong et al., 2006, 2009). Sample teachers would like to receive more professional development in evaluation methods (75%), teaching methods (60%), curriculum development (54%), classroom management (48%), and the use of computers in the classroom (34%).

Teachers in China depend heavily on textbooks (Ma et al., 2006). For example, classroom observation data revealed that the two sample schools' teachers tended to follow the content sequence of their textbooks. Teachers often used illustrations, examples, and exercises directly from the text. In some classes, teachers used teacher resource books, videos, and Microsoft PowerPoint presentations from the accompanying textbook DVDs. Ma et al. (2006) reported similar findings from their observations of Math teachers in Chinese primary schools.

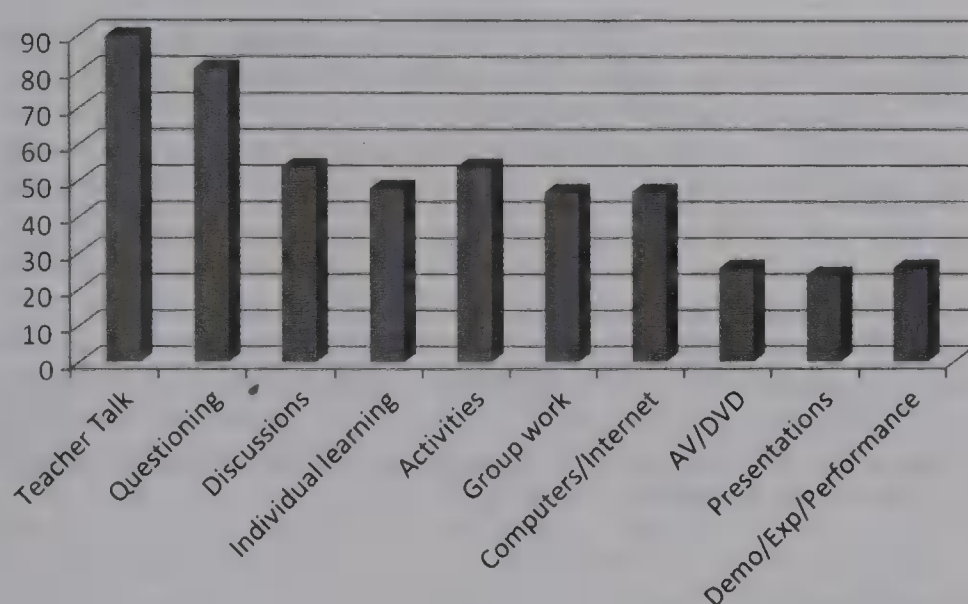


FIGURE 1 Teachers reporting of teaching strategies always/often used ($n = 289$) (color figure available online).

Figure 1 represents the teaching strategies that most teachers always or often used, whereas Figure 2 represents the most common student evaluation methods. The data reveal that sample teachers use a variety of teaching strategies, including teacher-directed methods (teacher talk, questioning, and discussions), student-centred activities (activities and group work), and use of technology. Predominant student evaluation methods included tests, class work, homework, and

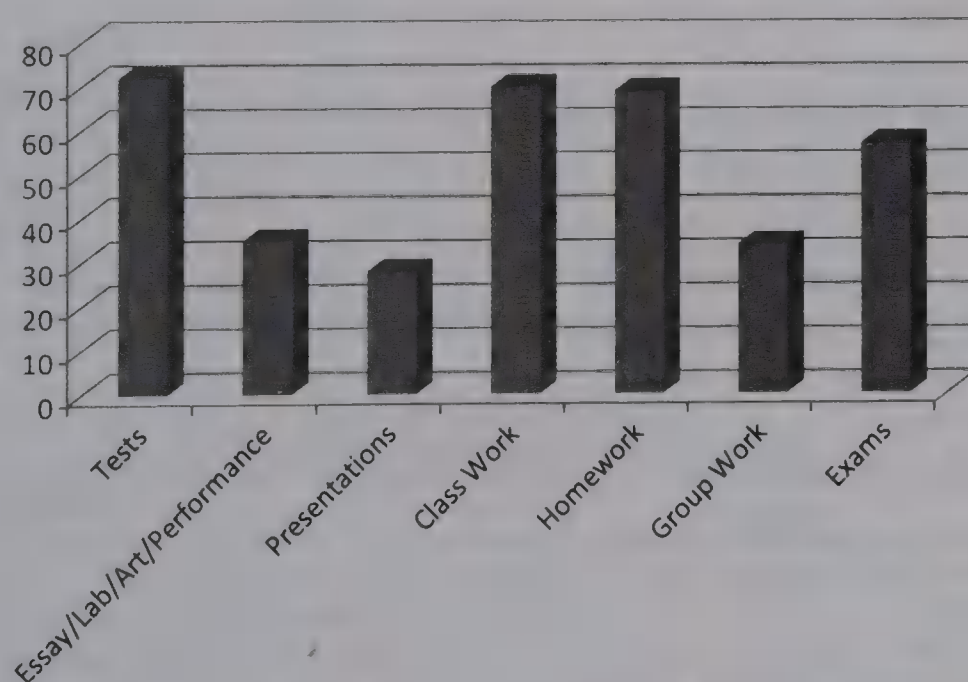


FIGURE 2 Teachers reporting of assessment strategies always/often used ($n = 289$) (color figure available online).

exams, each of which contributed to a student’s final mark. Ten percent of the sample teachers claimed that they were spending a lot of time on classroom management, whereas half (49%) said they spent a little amount of time. Students’ on-task time and work completion rates were between average and good. Top reasons given for lost time included lack of student self-discipline, boredom, and lack of basics or interests. As for the aspirations of their students, most teachers claimed that their students will pursue postsecondary studies, and only 18 teachers claimed that their students will enter the workforce. Sample teachers appeared satisfied with their courses (77%) and with their student achievement levels (72%). When asked for their opinion on the Chinese examination system, results were similar to those of the sample students—37% said the current system is unsatisfactory ($n = 273$), 20% rated it as satisfactory, and 43% were in-between. On the issue of dating while in school, only 15% said it was a good thing, whereas 25% said it was not. The rest selected in-between. Most of the aforementioned findings were similar to Joong et al.’s (2006, 2009) previous studies.

Special Needs Students

Sample teachers were asked to answer specific questions related to special needs students. Of those teachers surveyed, about 10% had special needs students integrated into their classrooms. Students with special needs included learning disabled and behavioural learners, as well as a few gifted and handicapped students. Teachers provided extra individual help and a modified curriculum for learning disabled students and special seating arrangements for behavioural or “active” students. Gifted students received additional enrichment.

Student Voices

Of the 1,903 student respondents from the 24 sample schools, most were from urban communities. Ethnic groups consisted mostly of Han (75%) and Zhuong (23%). Table 2 shows the correlation between students’ perceptions of the courses. There were significant correlations between course achievement and course interest (.541**), course difficulty (−.306**), course quality (.369**), and negative classroom behaviour (−.136**). This means that course performance was influenced by both students’ behaviours and students’ perceptions about the quality, interest, and easiness of the courses. There was a positive, significant (.229**) correlation between course difficulty and

TABLE 2
Correlation Between Course Variables in Student Sample

	Course Interest	Course Difficulty	Course Quality	Negative Behaviour
Achievement	0.541**	−0.306**	0.369**	−0.136**
Course interest		−0.183**	0.484**	−0.073**
Course difficulty			−0.147**	0.229**
Course quality				−0.045**

Note. **Correlation is significant at the .01 level, two- tailed. $n = 1,886$.

TABLE 3
Students' and Teachers' Perceptions of Teaching Methods (% Always/Often Used)

	Math ^a 40 Teachers	English ^b 43 Teachers	Physics ^c 65 Teachers	Chinese ^d 24 Teachers	Politics ^e 46 Teachers
Teacher talk	92% (85%)	91% (91%)	90% (84%)	92% (96%)	90% (87%)
Individual work	70% (42%)	67% (59%)	62% (43%)	67% (50%)	57% (47%)
Group work	24% (52%)	29% (41%)	20% (50%)	31% (58%)	20% (42%)
Discussion	31% (54%)	36% (52%)	25% (66%)	41% (67%)	29% (47%)
Activity learning	16% (46%)	25% (52%)	17% (61%)	25% (58%)	18% (49%)
Computer/Internet	24% (30%)	40% (45%)	26% (45%)	38% (70%)	36% (43%)
AV/DVD	11% (10%)	22% (45%)	15% (23%)	19% (44%)	14% (22%)
Presentations	17% (20%)	21% (21%)	16% (22%)	21% (26%)	16% (24%)
Demo/Exp/Drama	20% (25%)	18% (18%)	40% (38%)	17% (41%)	16% (23%)
Questioning	67% (75%)	60% (87%)	57% (79%)	62% (82%)	54% (67%)
Behaviours affecting learning	38% (16%)	35% (7%)	34% (12%)	30% (24%)	26% (4%)

Note. ^a*n* = 1,874. ^b*n* = 1,609. ^c*n* = 1,167. ^d*n* = 1,408. ^e*n* = 1,291. Demo = teachers showing the learners a model performance. Exp = performed by students, usually in science.

negative behaviour. More difficult courses meant worse behaviours. This may be due to student misunderstandings. A previous study by Joong et al. (2009) set in southwest China found similar results.

Table 3 lists the reported frequency of specific teaching methods, according to both students and teachers. The percentages of teachers' responses are in brackets. Sample sizes for both respondents are listed within the table. This allows for comparisons between the perceptions of teachers and students, highlighting any potential discrepancies. The number of teachers for both politics and physics included all sample social science and science teachers, respectively. These five subjects were selected because math, English, and Chinese are compulsory courses and most students enrolled in physics and politics in secondary schools.

It appears that those teachers surveyed used predominately teacher-directed methods, which included teacher talk, individualized work, and questioning. Both teachers and students appear to be in relative agreement about (see Table 3, within 10%) how often these strategies were used. The use of computer technology (mainly for teacher presentations) appears to be increasing when compared to similar results in previous studies (Joong et al., 2006, 2009). A similar increase is occurring with demonstrations and experiments in physics classes. As for student-centred lessons such as activity learning, group work, and to some extent discussions, sample students claimed that about one fourth of their teachers always/often used these strategies, whereas about half of the sample teachers claimed that they did. Similar discrepancies between teacher and student data occurred when asked about the use of computer technology; however, these discrepancies are much smaller.

There is not much discrepancy between student and teacher perceptions with regards to evaluation methods. The results in Table 4 indicated that sample teachers used, predominately, tests, exams, class work, and homework/assignments.

One significant result of this study is the increasing claim from students that discipline is becoming a problem in Chinese secondary schools. On the average, about one third of the students surveyed claimed that the behaviours of other students in their classes made it difficult

TABLE 4
Students' and Teachers' Perceptions of Evaluation Methods (% Always/Often Used)

	Math ^a 40 Teachers	English ^b 43 Teachers	Physics ^c 65 Teachers	Chinese ^d 24 Teachers	Politics ^e 46 Teachers
Tests	72% (73%)	61% (88%)	54% (76%)	59% (75%)	43% (57%)
Essay/Lab/Performance	29% (15%)	35% (38%)	39% (33%)	46% (75%)	22% (56%)
Presentations	22% (20%)	24% (21%)	18% (20%)	26% (38%)	17% (40%)
Class work	62% (80%)	51% (71%)	43% (70%)	50% (71%)	37% (52%)
HW/Assignment	82% (83%)	77% (88%)	69% (60%)	78% (79%)	60% (52%)
Group work	22% (35%)	23% (34%)	18% (38%)	24% (42%)	43% (30%)
Examinations	59% (60%)	53% (78%)	50% (49%)	53% (78%)	44% (49%)

Note. ^a*n* = 1,874. ^b*n* = 1,609. ^c*n* = 1,167. ^d*n* = 1,408. ^e*n* = 1,291.

for them to learn, even though only 10% of sample teachers claimed that they were spending a lot of time on classroom management. Classroom management appears to be a serious concern, especially in math, physics, and Chinese classes (see Table 3). Discipline was not a major concern in the previous studies (Joong et al., 2006, 2009).

The mean number of hours students spent on homework and studying was 2.8 hr per day (*SD* = 1.3 hr, *n* = 1,294). Tao (2003) reported a similar finding: To achieve good grades, students felt they had to spend most of their time on homework, allowing them little time to develop their own interests. When asked to whom they would go to discuss school marks and course difficulties, most listed friends or classmates over their parents or teachers (see Figure 3).

In an open-ended question on the gender issue, 70% (*n* = 797) of the respondents claimed that there was no relationship between gender and ability and achievement. Most claimed that male students tended to do better in science-related courses, whereas girls did better in arts-related courses. As for educational aspirations, of the 1,151 respondents for this question, 85% wished to attend university after completing secondary school, 3% intended to attend technical college, and 4.6% planned to begin work after completing school.

When asked for their opinions on the examination system, 39% of students said that the current system was unsatisfactory (*n* = 1,348), 17% found it satisfactory, and 44% were in-between. On

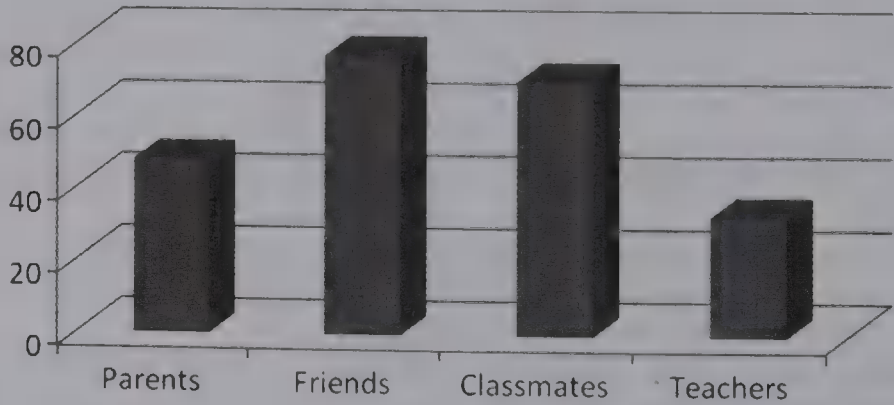


FIGURE 3 Whom do students go to for help (*n* = 1,328)? (color figure available online).

the issue of dating while in school, 40% said it was a good thing, 13% said it was not, and the rest were in-between ($n = 1,342$). Most of the aforementioned findings were similar to the previous studies (Joong et al., 2006, 2009).

Classroom Observations

For triangulation purposes, the researcher conducted classroom observations at one sample school from each of the four provinces, focusing on teaching strategies, assessment strategies, and curriculum materials. Student resources consisted mostly of textbooks, whereas teacher resources consisted mostly of hardware and software for DVD and PowerPoint presentations. All teachers had access to the Internet and computers, which they often utilized while preparing for their lessons. Classroom observation data correlated with most of the students' perceptions of teaching methods presented in Table 3. Teachers used predominately teacher-directed lessons (teacher talk, discussion, video, PowerPoint presentations and questioning) in Chinese, English, math, science, and social sciences classes. There were frequent demonstrations and occasional experiments in the science classes. English teachers were the only teachers to use activity-based lessons. Most teachers spent their preparation time marking students' homework, assignments, and tests.

Personal Opinions of the Changes

Major changes in the China reform have involved changes to curriculum, textbooks, and teaching strategies. To garner the opinion of teacher and parents, researchers ask respondents to express their opinions on these major changes in secondary education. Next are some of the most frequent or typical comments by those stakeholders surveyed for the study. The responses included are both positive and negative.

Quality Education Reform

Quality education should be the focus, develop students' many interests and characters, cultivate their abilities and willingness, that makes the students learn, work and develop in the correct way. (Male parent)

Teaching conditions have improved, with changes in teaching methods. Teaching with multi-media, advocating quality education and arousing students' creativity. (Parent with Junior High School education)

On the one hand, advocate quality education. On the other hand, the study of the basics is weakened. Students cannot master the basics. (Female parent with university education)

The curriculum should not be too difficult. I hope that they are as easy as foreign countries. In China, courses are difficult and also useless. I saw university graduates who cannot find jobs. (Grade 7 female student)

Thinking becomes more active, more openness in creative and logical thinking. (Senior HS chemistry teacher)

Analyzing ability declined, as well as basic arithmetic. (Senior HS math teacher)

Weak ability in understanding and applying what they have learned. (Female chemistry teacher with 20 years' experience)

Quality Education Reform and Teachers

Major change is that students want teachers to use new teaching methods and new ideas, more patience, and pay attention to their aptitudes. (Senior HS English teacher)

Although our country has gone through a lot of reforms, teaching methods are from the past, with little regard for quality education, only pay attention to marks. (Female parent with Junior High School education)

Curriculum is not changing, teachers cannot be changed. (Junior HS male student)

Quality Education is implemented with a lot of resistance. (Senior HS politics teacher)

Quality Education Reform and Exam System

Exam-oriented education needs reform. Now students study only for exams. What is the use of studying? I strongly suggest Chinese education learn from foreign countries, with discovery, creative thinking, so that students can learn real and practical knowledge. (Male senior HS student)

High school exam system is not good. It should not be "a single exam to decide one's fate." Students should have an all-round development, and not restricted to an exam-oriented education. (Female senior HS student)

Curriculum should have been taught with more interest. But due to the pressures of time and exam, the interesting contents are reduced. (New female geography teacher)

Variety of teaching approaches but little changes in evaluation. Great emphasis on exam. It's difficult to achieve the goals of quality-education reforms. (Male HS Chinese teacher with 15 years' experience)

Better not to decide on one's fate with one exam. Good grades mean everything is fine. Those with low grades appear to be abandoned. The fact is in the real world, how well one succeeds has no relation to exam results. Exam system should cater to everyone. Exam system will only make students hate school, rather than enjoy school. (Female HS Chinese teacher)

DISCUSSION AND CONCLUSION

This follow-up study drew attention to many educational reforms that have had direct impact on teachers and, in turn, on students and parents in China. The reforms include curriculum planning, teaching strategies, student evaluation, the integration of technology, special education, and high-stakes examinations. Observations from the results of this study indicate that teachers in China have dedicated themselves to the education of students and have made the necessary changes to adopt most of these reforms. In general, most of the findings are similar to previous studies (Joong et al., 2006, 2009). A majority of the teacher and parent respondents were satisfied with

the reforms, though some sample teachers are still struggling with the transition. In contrast to the previous studies, however, teachers indicated that there was adequate support in terms of resources and professional development, especially in the key areas of the current reforms: teaching methods, curriculum development, and the integration of technology. Still, resources in most rural schools are scarce, requiring rural teachers to travel to cities for training (Ma et al., 2006).

Within teaching practices, most teachers claimed that they were using a variety of teaching methods, although teacher-directed strategies still dominated. Students indicated, however, that their teachers used teacher talk, individualized learning, and questioning methods most frequently. Some teachers used student-centred lessons such as student activities, group work, and discussions. There were conflicting perceptions of how often they were used. As for student evaluations, both sample teachers and students claimed that traditional tests, class work, homework, and exams were used most often. Sample teachers had difficulty changing current teaching praxes (teacher-directed lessons) and student evaluation modes (tests and exams). All educators struggled to create new tasks and implement new modes of teaching and evaluation.

In-service professional development and resources seemed adequate and appeared to be working when compared with previous results (Joong et al., 2006, 2009). Provisions were made by teacher respondents to meet the needs of special needs students in mainstreamed classes. Teachers also pointed to the negative effects resulting from reforms or societal changes. These effects included low student motivation and management issues. These problems have become more problematic than in previous studies (Joong et al., 2006, 2009), as almost one third of the sample students and 10% of the teachers expressed concerns related to this issue. This is more of a problem for teachers of Chinese, math, and science. Teachers cited a variety of possible explanations, including effective activity-based learning and group work strategies, lack of job opportunities upon graduation, Internet and computer games, and the effects of single-child policy with six parents/grandparents for a child. Classroom management needs increased as new modes of teaching and transitioning created new situations for students to deviate from expected behaviours. More in-service and preservice training (classroom management and activity-based teaching strategies) and resources could impact management success.

Another indication that the reform effort is bearing fruit is the gradual change seen among evaluation strategies. Although it may be too optimistic to assume that Chinese teachers are breaking away from their teacher-directed and examination-led tradition, there are indications that some are exploring new strategies, such as the integration of technology, group work, activity-based learning, and performance assessments (Lo, 1999). Demonstration lessons and teacher competitions on innovative teaching methods are common practices (Cheng, 2004). Results suggested that reforms had a direct impact on both students and teachers. Gender is not an issue in China, as there are more females in sample sizes of both teachers and students. The number of women in the parents sample increased from 30% to 47% as compared to the previous study (Joong et al., 2006). However, one fourth of the sample students believed that boys tend to do better in science whereas girls are better in the arts. On dating, most respondents thought that it was normal for students to date as long as it does not interfere with schooling. On the issue of the examination system, in general, about one third of all respondents claimed that it was unsatisfactory and 20% claimed that it was satisfactory. The rest fell somewhere in-between. On the issue of dating while in school, about one third of parents and students said it was okay and 40% said it was good, 13% said it was not good, and the rest were in-between.

The persisting problem with the current reform lies on the examination system. Teacher respondents claimed that there was little room for introducing activity-based learning and other experimentation while also preparing students for the examination. The Chinese government has attempted to modify the examination system, but these attempts have had little effect, as many students still wish to enter postsecondary institutions and require good examination results to do so. Huang (2004) was correct in saying that examinations still guide teaching and learning in schools and that China should reform the examination system to improve the quality of education. With more and more parents and teachers suggesting that the examination system should be modified, the government will have to examine alternatives.

Tao (2003) suggested that reforms involve not only the entire education system but also society. Parents and other citizens need to place less emphasis on examination results. Zhang (2004) also claimed that the solid tradition of exam-oriented education has affected the curriculum, teaching methods, teacher-student relationships, and the system of evaluation and selection. There are clear evidences for these claims in this study. Chinese teachers, educators, and educational leaders should decide whether “quality education” is what students and society need at this time.

Recommendations

Chen (2002) from the Chinese Department of Education recommended that Chinese teachers integrate new methods and yet maintain an emphasis on basic knowledge and skills. The Ministry of Education of the People's Republic of China (2010) report recommended “the undue importance attached to passive learning, rote memorization and mechanical drill should be amended. Students should be urged to take active part in learning activities” (p. 3). Huang (2004) recommended that teachers create favourable learning conditions through experimentation, which includes making use of resources, facilities, and technology; stimulating students' creative abilities; supporting cooperative learning; and using a variety of assessments. Sample teachers struggled to do this, especially rural teachers, as in-service professional development and resources were in abundance in urban areas but lacking in rural areas. This hampered implementation greatly.

This article thus recommends that the Ministry of Education provide more funding for resources and training in schools, particularly rural ones. Ma et al. (2006) posed similar recommendations. Second, it is recommended that all teachers adopt, or continue to use, a variety of teaching strategies and reduce the amount of teacher-directed lessons. Third, Ministry officials should continue in their attempt to “reform [the] examination system to improve the quality of education” (Huang, 2004).

Teachers play key roles in reform processes as the agents of change who work directly with students. The results and conclusions of this study highlighted the key role of teachers in successful reform policies. Fullan (2000, p. 12) suggested that education reform depends on how teachers make sense of the mandates and policies. Reform needs widespread input, acceptance, and implementation if it is to have the desired effect. In the case of large-scale reform, including the voices not only of teachers but also of students and parents is crucial in the change process. DeFur and Korinek (2010) claimed that “the credibility of students as expert witnesses of effective instruction seems undeniable” (p. 18). Parents in China, who are the consumers of the educational process, are at a crossroads in deciding whether the “quality” movement is what their children and society need. In China, parents must “pay attention to marks” for their children to receive

admission to the best universities. Leaders who want to implement change must pay attention to the swaying voices of students, teachers, and parents.

Policymakers and educators in all jurisdictions should learn from the Chinese reform efforts. I hope that the findings and recommendations from this study assist stakeholders in designing curricula, in adapting exemplary teaching strategies, and in implementing quality assessment strategies. I hope the finding will provide the basis for further research on the implementation of education reform in China and other jurisdictions.

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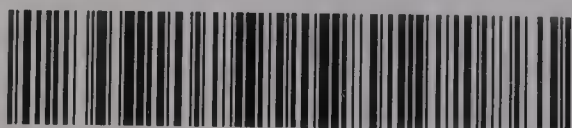
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July 2012

What Public and Religious Private Schools Can Learn From One Another

William H. Jeynes

California State University at Long Beach

The purpose of this issue is quite unique: to examine how both public and private religious schools can learn from one another in order to produce a more efficacious education system overall. Generally, most academic articles are rather insular in their approach, either focusing on what public schools can learn from private religious schools or vice versa. The scholars represented in this issue, however, contend that it is absolutely essential for both sectors to learn from one another in order for both sectors to thrive. This issue draws from six of the leading religious school scholars in the world to address this topic.

In his article entitled, “A Meta-Analysis on the Effects and Contributions of Public, Public Charter, and Religious Schools on Student Outcomes,” William H. Jeynes presents the results of an extensive meta-analysis on the effects of religious private and traditional- and charter-public schools. This article is designed to determine some of the strengths and weaknesses of these institutions. This is the most extensive meta-analysis ever taken on this topic and constitutes the “glue” around which the remaining articles will revolve. In this meta-analysis Dr. Jeynes not only examines the studies that compare faith-based schools versus traditional public schools but also looks at levels of student achievement at charter schools versus public schools. This is the first published meta-analysis ever to compare all three types of schools. Dr. Jeynes then examines the specific comparative strengths of each of these types of school.

Dick M. Carpenter II and Krista Kafer review the history of private school choice, from the Colonial Era to 2012 in their piece entitled “A History of Private School Choice.” The article finds that the development of choice has been an ongoing process in which legislatures and courts have established the constitutionally acceptable structures and procedures of choice. The authors also note that proponents’ philosophical and theoretical underpinnings for choice have shifted from arguments based on freedom to arguments based on the economics of educational marketplaces, competitive effects, and increased student achievement.

The third article by Leslie J. Francis and his colleagues provides a quantitative analysis of British pupils, examining the spiritual health of those attending religious and public schools. It is called “Defining and Assessing Spiritual Health: A Comparative Study Among 13- to 15-Year-Old Pupils Attending Secular Schools, Anglican Schools, and Private Christian Schools in England and Wales.” Francis asserts that moral health is a major goal of all forms of schooling and that understanding the results will help provide guidance to educators in both the public and religious sphere.

Bruce S. Cooper and his colleagues note in their article, "Finding a Golden Mean in Education Policy: Centering Religious and Public Schools," that the modern charter school movement has blurred the distinction between religious and public schools. To the extent that this is true, it is becoming increasingly necessary for religious and public educators to learn from one another. He examines a wide variety of schools of faith, including Jewish and Islamic schools.

In their article entitled "Building New Bridges to America's Schools: Lessons From the University of Notre Dame," Timothy R. Scully and John J. Staud report that during the 1970s some prestigious Catholic institutions, most notably Notre Dame University, stepped back from many of their educational responsibilities. They note, however, that Notre Dame has recently made K-12 education a major priority once again. Consequently, Notre Dame and many Catholic educators are currently examining various strategies, including those practiced by secular institutions, in order to reaffirm their place in American schooling. Scully and Staub specifically examine the University of Notre Dame's Alliance for Catholic Education (ACE) program, which was founded in 1993. ACE began with 40 college graduates who committed to serve as teachers in underresourced Catholic elementary and secondary schools clustered in eight sites across the southern United States and has since grown tremendously. Reverend Scully and Dr. Staub examine how ACE is aiding in Notre Dame's reentry into elementary and secondary education.

Charles J. Russo and William E. Thro's article, "Reflections on the Law and Curricular Values in American Schools," reflects on how educators in both public and religious systems can learn from one another as they seek to ensure the presence of diverse educational perspectives. The first part of the article examines legal developments on selected curricular issues, whereas the second section offers recommendations on how educational leaders can work to maintain the vibrancy of American schools by affording parents the opportunity to send their children to study in schools best meeting their needs.

William H. Jeynes and Fred Beuttler offer an article entitled "What Private and Public Schools Can Learn From Each Other." They note that public school and faith-based private school educators often concern themselves most with the health of their own sector. The authors contend, however, that the United States would benefit if American educators viewed the schooling system more holistically and expressed a greater willingness to learn from those in the other sector. Jeynes and Beuttler assert that schools in each sector have specific strengths that can, at least to some extent, be applied to the other sector as well. If this perspective is applied and practiced, the authors believe that the overall American school system will be strengthened and revitalized to sufficiently compete in a global context. The authors assert that the timing of certain developments may be such that this is the best time for such a reorientation to take place.

Together these articles work to encourage both private and public educators to be more open-minded toward the contributions of each sphere. One can certainly argue that a more holistic approach to American education will produce a healthier school system in which educators are more likely to work together to (a) produce better overall results and (b) appreciate the diversity added when the country encourages an education system that facilitates both a healthy private sector as well as a vibrant public sector.

What Private and Public Schools Can Learn From Each Other

William H. Jeynes

California State University at Long Beach

Fred Beuttler

Carroll College University

Public school and faith-based private school educators often primarily concern themselves with the health of their own sector. We contend, however, that the United States would benefit if American educators viewed the schooling system more holistically, in the process expressing a greater willingness to learn from those practicing in the other sector. We assert that schools in each sector have specific strengths that can, at least to some extent, find application in the other sector as well. If this perspective is applied and practiced, we believe that the overall American school system will be strengthened and revitalized sufficiently to compete in a global context. We assert that the timing of certain developments may be such that this is the best time for such a reorientation to take place.

The purpose of this article is to examine how both public and private religious schools can learn from each other in order to produce a more efficacious education system overall. Generally, most academic articles are rather insular in their approach to such discussions, often choosing to focus on what public schools can learn from private religious schools or vice versa. Too frequently educators focus their concerns on their own particular sector (Bartman, 2007; Berliner & Biddle, 1995; Bracey, 1997). That is, public educators tend to be most concerned with the success of public schools, and faith-based instructors often are most focused on the health of religious schools (Berliner & Biddle, 1995; Bracey, 1997; Jeynes, in press). This article, however, which is based in part on the meta-analysis and other articles presented in this special issue, examines this issue more holistically. It befits Americans to think more broadly and think in terms of what is best for all sectors of American education. Ultimately, the success of both sectors influence American children and it is their welfare with which Americans are most concerned (Bartman, 2007; Jeynes, 2003b, 2008c). For American schooling, broadly defined, to thrive, it is patent that both public school educators and religious school educators learn from one another.

It is clear from the articles presented in this special issue and from other sources that there are several vital ways in which educators in the religious and public sector can learn from one another. We begin our broad discussion by analyzing a few of these vital considerations.

WAYS IN WHICH PUBLIC EDUCATORS CAN LEARN FROM RELIGIOUS SCHOOLS REDUCING THE ACHIEVEMENT GAP

A number of social scientists believe it is crucial that public school educators learn from the example set by religious schools (Ireland, 2005; Jeynes, *in press*; Sekulow & Fournier, 1996). The findings of the studies in this journal issue support the views of these social scientists, who assert that public schools can learn from the sense of purpose, self-discipline, and the work ethic that is typically emphasized at faith-based schools. Not only do the results of this article indicate that students in religious schools outperform their counterparts in nonreligious schools on virtually every measure of academic achievement, but they also indicate that religious schools reduce the academic gaps commonly existing between low socioeconomic status (SES) and high SES students as well as between Black and Latino versus White students (Jeynes, 1999, 2003a, 2010b). Because closing the achievement gap represents one of the primary goals of educators, it is logical that if educators in religious schools have learned to produce positive outcomes then they must have something to teach the secular community (Bryk, Lee, & Holland, 1993).

Different theorists have distinct explanations about why students from faith-based schools may outperform nonreligious school students. Bryk et al. (1993) argued that religious schools have a more disciplined atmosphere. Other researchers contend that religious schools excel because they emphasize traditional values (Coleman, Hoffer, & Kilgore, 1982; Jeynes, 1999, 2003a). Further research is necessary to conclude just what aspects of religious schooling give students from these schools the academic advantages that, on average, they enjoy. Based on prior research, there do exist certain definite attempts to imitate religious schools in secular settings (Algera & Sink, 2010; Jeynes, 2005; Jolfs, 2010). Researchers should attempt to confirm whether the areas that are being imitated help explain the academic gap between students in faith-based and public schools and whether these attempts at imitation have proven successful.

One reason why youth of color and low SES may perform better in school is because religious schoolteachers maintain high expectations and high academic standards for these students. Mentzer (1988) pointed out that religious schools frequently require students to complete more homework than nonreligious schools. Hoffer (1997) and Bryk et al. (1993) noted that religious schools encourage students to take college preparation courses more than one commonly witnesses in public schools. Research evidence suggests that disadvantaged children, in particular, benefit from this emphasis on high academic standards (Coleman et al., 1982; Gaziel, 1997; Jeynes, 2003b). Social scientists suggest that there may be a myriad of other areas in which religious schools can serve as a model for public schools. For example, Irvine and Foster (1996) argued that religious schools have a higher degree of racial harmony and that this helps explain why minority children do well in religious schools. A similar finding appears to have been documented in the research (see Jeynes, 2010b).

Another reason why student school outcomes tend to be better in faith-based schools and why the achievement gap is smaller could be the presence of character education instruction (Algera & Sink, 2002; Jolfs, 2010). This leads to a discussion of character education, which is another area where public schools can learn from faith-based ones. Character education, which can improve students' self-discipline and responses to failure, adversity, and frustration, is a topic of express instruction at religious schools.

CHARACTER EDUCATION

Character education was once a major part of public school education. After state sanctioned prayer and Bible reading were removed from the public schools in 1962–63, however, character education ceased to be a major emphasis in many public schools (Haynes, 1999; Jeynes, 2007; Miller, 1999). Immediately following 1963, there was an abrupt decrease in most major academic achievement measures and a sudden increase in adolescent crime, which rose 300 to 700% over the next two decades (U.S. Department of Education, 2011; U.S. Department of Justice, 1993). From 1963 to 1980, average test scores on tests such as the Stanford Achievement Test, the California Achievement Test, the Scholastic Achievement Test, and the Iowa Test of Education Development among others decreased more than at any time in the history of these tests (U.S. Department of Education, 2011). Social scientists differ on the extent to which the absence of character education in the public schools contributed to these trends (Algera & Sink, 2002; Brunsmma, 1998). However, in the eyes of many educators, character education is important in the development self-discipline, which is viewed as necessary to perform well in school and avoid harmful behavior (Edwards, 2000; Jeynes, 2010a; Ryan & Bohlin, 1998).

In contrast, character education remains a key component of the Christian school curriculum (Ireland, 2005; Jeynes, in press; Jolfs, 2010). As much as academic instruction is esteemed in these schools, educators in Christian and other faith-based schools believe that personal virtue is even more important (Ireland, 2005; Jeynes, in press; Jolfs, 2010). They maintain, much like Cicero and Martin Luther King, that the most dangerous person in the world is someone who is intelligent but not virtuous (Cicero, 2001; M. L. King, 1998; Jeynes, 2010a). They also assert that a child of character today will be a person who excels scholastically in the future.

The Historical Presence of Character Education in America's Public Schools

In truth, these emphases are not new or revolutionary (Middleton, 2004). Instead, for centuries these have been the most treasured beliefs held by the vast majority of prominent educators in the United States. Some of these individuals and groups include the Puritans, Noah Webster, George Washington, Horace Mann, Friedrich Froebel, Johann Pestalozzi, William McGuffey, and virtually all the prominent American school leaders into the early 1900s (DiCianni, 2004; Holmes, 2001; Middleton, 2004). If one examines the prior centuries of educational practice in Western Europe, the list becomes substantially longer and includes such wise minds as Plato, Aristotle, Jesus Christ, Cicero, Quintilian, Apostle Paul, Augustine, Luther, Calvin, and Erasmus (Jeynes, 2007; May, 1988; Palmer, 2001). Each of these leaders, although they lived in radically different times and settings, attested to the primacy of moral instruction over exclusively intellectual training (Middleton, 2004; Palmer, 2001). They esteemed personal holiness and self-discipline to the degree that they did because these leaders believed that such qualities were vital to a civil society but also because they asserted that these qualities formed the foundation for future scholastic success (Jeynes, 2006; May, 1988; Palmer, 2001).

Naturally, many of the individuals cited in the last paragraph predated Horace Mann and the founding of modern public schools. Nevertheless, there is a certain irony to the fact that the early pioneers of public schools were strong advocates of moral instruction. Many such proponents

of early public schools believed that moral instruction was the most salient component of the common school curriculum (Bailyn, 1960; McKnight, 2003). Along these lines, Mann declared that the most important goal that educators should have is “best expressed in these few and simple words: ‘Train up a child in the way he should go, and when he is old he will not depart from it’” (Proverbs 22:6; Mann, 1957, p. 100). This biblical truth states the essence of the educational philosophy of Horace Mann. Horace Mann believed that Bible instruction and respect for faith-based values and practices was at the foundation of a healthy character curriculum. Mann in his *Twelfth Annual Report* asserted,

But, it will be said that this great result, in Practical Morals, is a consummation of blessedness that can never be attained without religion; and that no community will ever be religious without a Religious Education. Both of these propositions, I regard as eternal and immutable truths. Devoid of religious principles and religious affections the race can never fall so low that it may sink still lower.

With this orientation in mind, Urban and Wagoner (2000, p. 107) affirm, “For Horace Mann and the other common school reformers, moral education was the heart of the curriculum.” Moreover, Thomas Hunt and Marilyn Maxson (1981, p. 14) observe, “For Mann, then, moral education was the key; it was a major reason for the existence of the common school and for significantly expanding its function.” Filler (1965, p. ix) adds, “The essence of Mann’s program was moral. He believed not only that education carried moral responsibilities, but prosecuted without them, it could only produce more evil than it had ever inherited.” (as cited in Kliebard, 1969, p. 73)

The emphasis on character- and religious-instruction in America’s public schools certainly was not limited to Horace Mann. As the 20th-century historian Ellwood Cubberley (1909) noted, “The work of public education is with us . . . to a large degree, a piece of religious work” (p. 68). Calvin Stowe played perhaps the most important role in the burgeoning of common schools in the Midwest (Rippa, 1997). He was the husband of Harriet Beecher Stowe, the author of *Uncle Tom’s Cabin*. He may have been the foremost national spokesman for the belief that the position of General Secretary of Education should be in place in each state (Stowe, 1836). Calvin Stowe traveled to Europe in 1836 and reported back to American education leaders about the practices of the European schools that the United States public schools should adopt. Stowe reported that the European teachers strongly relied on the teachings of the Bible for the moral instruction that took place in their schools. Furthermore, he observed that Christian education was at the forefront of the European common school education and was responsible for much of its success (Stowe, 1836).

Samuel Seelye (1864) was another framer of the founding public schools. He affirmed that “Christianity is essential to education” (p. 3). Johann Pestalozzi technically was a Swiss educator but had a prodigious impact on American education in terms of propounding the concept of the maternal role of the school. Pestalozzi appreciated the salience of a religious foundation in schooling (Spinka, 1967). As Robert Ulich (1968) noted,

Both Pestalozzi and Comenius were so intrinsically religious that their piety shines through every one of their works. They could not speak of nature without thinking of God as its creator; they could not speak of the human being without sensing the divine in even the poorest soul. (p. 30)

Pestalozzi believed that education in its essence had biblical roots and a definitive Christian focus. In other words, the love of God and neighbor, which Christ asserted were the two most prominent commandments. On this issue, Pestalozzi (1801) declared, “Thus it is evident that

the truth of fundamental and organic education and the totality of its means issues from the divine spark which is planted into human nature and harmonizes with the spirit of Christianity” (p. 423). Friedrich Froebel (1782–1852) is best known for being the founder of the kindergarten. He conceived of the kindergarten as being fundamentally distinct from the elementary school. He saw the kindergarten as foundational for the remainder of the schooling experience (Doherty, 1977; Downs, 1978; Slight, 1961). He believed that an emphasis on moral character was necessary for students to emerge as compassionate, righteous, and intelligent human beings and that it must precede a focus on intellectual development (Doherty, 1977; Downs, 1978; Slight, 1961). Fruhling (1958) added, “Froebel’s deep religious sense showed in all facets of his writing” (p. 31). Froebel maintained that the essence of the kindergarten was to enable children to grow up, like a garden, and experience unity with God and the individuals around them. In Froebel’s kindergarten paradigm, as one directs children into experiencing unity with God, the teacher’s primary focus becomes God-likeness in the children. In the *Education of Man*, Froebel (1898) asserted, “And God-likeness is and ought to be man’s highest aim in thought and deed” (p. 59). Froebel believed that it was very important that the school day always begin and end by praying and giving praise to God, especially by singing hymns. He generally allotted over an hour to Bible reading and praise. Froebel believed that although the academic had some place in the American kindergarten, the spiritual and moral foundation created was what was of greatest import (Slight, 1961).

William McGuffey was a minister and leading Christian intellectual who wrote the McGuffey Readers, which sold 120 million books between 1836 and 1920. This makes McGuffey’s Readers one of the top four selling books in American history. McGuffey helped continue the tradition of the primacy of moral instruction in America’s public schools. McGuffey believed that, yes, intellectual training was important, but character development was even more important. As Westerhoff (1982) asserted,

First religion, then morality, and last knowledge, that was the focus of their content. We should not be surprised, therefore, to learn that McGuffey’s Readers read more like a theology textbook than a children’s elementary schoolbook. Life is God-conscious and God-centered in McGuffey’s Readers. (p. 103)

The McGuffey Readers utilized the Bible as a means of moral edification in two ways. First, many of McGuffey’s writings directly focused on the Bible as a primary source of character instruction. Second, McGuffey also often treated the Bible and moral education throughout the academic curriculum as well (Hunt & Mullins, 2005; Ruggles, 1950). As much as McGuffey wanted the students who read his book to develop into intelligent human beings, he particularly wanted the students to become virtuous. McGuffey valued qualities such as love, faithfulness, self-discipline, and loyalty as even more important than intelligence.

WAYS IN WHICH RELIGIOUS EDUCATORS CAN LEARN FROM PUBLIC SCHOOLS COLLABORATION

One quality of the public school system that has clearly emerged to a great degree over the last several years is a greater level of systemized collaboration among the public schools. This trend has become more patent with the rise of the charter school movement in the public school sphere. It is clear that over the last 35 years the federal government has made public education a higher

priority than it was before (Peterson, 2006; Zehr, 2004). Consequently, public education strategies are much more standardized and focused than they were decades ago (Peterson, 2006; Ravitch, 2010). Two of the chief indications of this trend are the marked increase in the number of charter schools and standardized testing (Jeynes, 2006; Ravitch, 2010). As a result, there is a much more tangible sense of direction evident in public instruction than was the case before 1975 (Jeynes, 2006; Ravitch, 2010; Zehr, 2004).

Although religious educators are quick to acknowledge these federal trends, many would cringe at emulating public schools' notions of organization and standardization (Anitt, 2003; Jeynes, 2006, 2008c). Many faith-based school leaders view these trends as producing a monolithic public education system that is rigid, overly standardized, and stifling to teacher and student creativity (Glenn, 2011; Jeynes, 2006; Peterson, 2006). Furthermore, many religious schools believe that public schools' focus on strategizing to improve public school test scores has fostered a narrow-minded view of education that largely dismisses the private sector (Peterson, 2006; Prothero, 2007). In focusing on the improving education in the public sector without seeking to work in cooperation with faith-based schools, they believe that the public sector seeks to silence expressions of educational diversity that are apparent in the private sector (Anitt, 2003; Prothero, 2007).

Nevertheless, even if one assumes for a moment that some of the strategizing in the public sector has led to negative outcomes, the ostensible organization of the public sector leads one to ask whether private religious schools might benefit from a higher degree of organization and strategy, if in fact such actions are pursued with sagacity.

There are several reasons to think that schools of faith, especially when they exist within the same branch of faith (e.g., within a Christian or Jewish branch), might derive substantial benefit by developing a broader strategy. Here are a few of those reasons.

First, private schools might wish to consider developing a common fund designed to help struggling schools facing financial emergencies. Religious denominations are at a decided disadvantage when compared with the federal, state, and local government when it comes to school funding. The various levels of government essentially force people, via various modes of taxation, to support public schools (Gant, 2005; Peterson, 2006; Reiland, 1997). This fact ensures a certain level of financial support (Gant, 2005; Reiland, 1997). As a result, even the very poorest public school students receive more for their education than the average student attending a faith-based school (Anitt, 2003; Bobbitt, Johnson, & Rochon, 1992; Coons, 1997). For this reason, one can justify schools of faith supplying pools of finances, information, and other support systems to prop up other schools of faith facing an emergency situation. A common funding pool or universal information database could help support schools designed to achieve common faith-based goals. That is, nearly all schools of a common faith (e.g., Christianity) want schools of the same faith to succeed. Why not facilitate this goal by pooling financial resources for emergencies and by sharing information about students who are interested in attending a faith-based school. Given the financial disadvantages that faith-based schools face, it is imperative that religious educators think more broadly about how best to survive in the present environment (Anitt, 2003; Coons, 1997; Prothero, 2007). The reality is that public education enjoys a near monopoly on elementary and secondary education, and faith-based schools must think creatively in order to realize their potential.

Second, leaders of faith-based schools should meet more frequently and at a greater variety of levels to determine how they can learn from one another (Jeynes, 1999, 2003a, 2008b). Because public schools operate in more well-defined districts than do religious schools, it is often easier for school leaders in the same or adjoining districts to meet together and learn from one another

(Jeynes, 1999, 2003a, 2008c). These meetings may result in strategies that can benefit all schools involved. A recent meta-analysis that appeared in *Catholic Education* indicates that Catholic and Protestant schools have a great deal that they can learn from one another, because their strengths reside in somewhat different areas (Jeynes, 2008b). The results suggest that both Protestant and Catholic schools could become more efficacious if they developed stronger bonds and common strategies that would make both varieties of faith-based education stronger.

Third, the faith-based school community should increase collaboration with the private education sector and the private sector generally. The private education sector includes not only faith-based schools but also families who home school. These additional components of private education also have shown successes that can be utilized to help strengthen faith-based schools. For example, one of the most intriguing aspects of homeschooling is that it appears to be the only education discipline that demonstrates no relationship between family SES and educational outcomes. That is, young people from low SES families apparently do just as well academically as those from high SES families (Mayberry, Knowles, Ray, & Marlow, 1995). Social scientists see two for this phenomenon. First, those children who are homeschooled receive a high level of individual attention. Second, those parents who choose to homeschool their children are highly involved in their children's education, almost by definition. Features of other expressions of private education such as homeschool can provide added insight that can increase the efficacy of faith-based schools.

In addition, faith-based schools can also strengthen their ties with the more general aspects of the private sector. Over the last 40 or 50 years one can argue there has been an increasing tension between those in the private business sector and the public school system (Peterson, 2006; Ravitch, 2010). From the private sector's viewpoint, they feel that public schools increasingly graduate an ill-prepared and undisciplined cacophony of students. Public educators, however, may believe that the private sector's insistence that students meet certain proficiency levels will lead to schools acting like a cog in the machine of capitalism (Ravitch, 2010). Those in private education may be better equipped than those in public schools to appreciate the realities of global competition that require students to eventually serve in a skilled labor force (Gant, 2005; Prothero, 2007). With tensions rising between public educators and business people, there is an opportunity to give parents and students the impression that faith-based education is conducive to possessing skills that are considerably more marketable in the employment world.

COMPETITION

Religious school leaders can also learn from the public school system's attempt to foster more competition within the system. To be sure, countless studies have indicated that students in faith-based schools achieve at higher academic levels than their counterparts in public schools (Jeynes, 1999, 2003b). This finding is patent even if one adjusts for SES and selectivity (Jeynes, 1999, 2003a). In this sense, there is typically a higher level of competition among students at a faith-based school than there is at a public school. That faith-based advantage remains fully intact and apparently has remained quite stable over the last several decades. Nevertheless, what the public charter school movement has sought to do is increase the competition between schools in the public sphere (Peterson, 2006; Ravitch, 2010). Admittedly, the evidence appears to suggest that the increased competition (a) has been relatively minimal, because charter school enrollment

is fairly low, and (b) has had little or no positive impact on the scholastic outcomes of the surrounding schools (Peterson, 2006).

Nevertheless, one could argue that faith-based schools, which already have elevated levels of achievement versus public schools, would be more likely to stimulate the level of achievement necessary to spawn the benefits of competition (Jeynes, 2000). A considerable number of social scientists propound this precise theory. For example, Chubb and Moe (1990) asserted that competition will yield significant levels of competition only if the private and public sectors are competing against one another. They ask a rhetorical question: Why is it that most people regard the American university system as the best in the world when virtually no one believes that the nation's elementary and secondary schools rank first (Chubb & Moe, 1990)? In fact, they argue that most foreign educators view American elementary and secondary schools as mediocre at best (e. g., Stevenson & Stigler, 1992). Chubb and Moe opined that the difference is the extent to which there is competition between the public and private sectors. So, for example, at the university level University of Southern California (private) has an academic rivalry with University of California, Los Angeles (public), Stanford (private) competes with University of California–Berkeley, and Michigan (public) goes head to head with Notre Dame (private). In contrast, they argue, America's public schools have a virtual monopoly on the student body, and competition between the two sectors is almost nonexistent (Chubb & Moe, 1990). To the extent that the participation of the private sector in competition between educational institutions generates rivalries and so forth, it would seem reasonable to actuate faith-based schools to increase competition with one another. Some of the ways that these schools could engage in this competition include, but are not limited to, (a) offering unique academic and internship programs that are designed to improve on or offer alternatives to existing initiatives in other private schools; (b) offering college credit courses that could be applied to faith-based colleges, which would potentially produce the dual benefit of saving college tuition money for students and increasing enrollment for faith-based colleges; and (c) making opportunities to work with faith-based organizations available in areas where religious initiatives tend to be strongest, such as in community service. Once again, the schools could offer credit at either the senior or college level for participation.

Such an increase in competition could benefit faith-based schools, and the overall state of American education, in two ways. First, the increased competition could cause faith-based schools to become more effective. It is conceivable that if religious schools raise the bar further, competition will yield real benefits because the performance bar will have been raised to the highest level. This is different than competition among public schools, which may simply raise the ground floor for performance. Second, if faith-based schools succeed in raising the bar for themselves and American schooling as a whole, it may enhance the case for school choice. That is, if faith-based schools improve their already-elevated levels of scholastic outcomes, the religious school edge over public schools will likely increase, providing added incentive to continue encouraging school choice initiatives that include religious schools.

EDUCATING THOSE WITH SPECIAL NEEDS

One of the key areas where private schools can learn from public schools is in the treatment of the exceptional child. There are a number of broad principles that have emerged, including the government's responsibility to establish the right to education, equality, inclusion, and adequate

resources. Initially, European reformers in the early 18th century began to emphasize the education of persons with disabilities, especially of the deaf, blind, and intellectually disabled. Partly a product of the Enlightenment, this focus was also motivated by particularly religious reasons: “Much education for people with disabilities have been inspired by evangelical commitment; early pioneers and teachers often arose from the clergy” (Winzer, 2007, p. 22). The earliest institutions for the disabled in America were established in the early 19th century, combining “humanitarian philosophy, evangelical commitment, and unbounded philanthropy,” (Winzer, 2007, p. 24), and embodied three principles: protection of the disabled child, separation, and dependence. In the absence of publicly funded education, such services for disabled persons were dependent on public and private charities. The common school movement initially had a vision of openness to all students, but by the 1890s, public schools in most states were segregating disabled students into other institutions for the disabled or special classrooms, or even exempting them from compulsory education laws. By the 1930s, a profession of specialists had emerged, trained in serving children who were deaf; blind; maladjusted; or physically, emotionally or intellectually disabled. Segregation even expanded in the 1960s, especially with new categories of learning disabilities, but a counter trend, in part derived from the civil rights movement, challenged the exclusion of the exceptional child from the regular classroom. The direction of special education moved “from isolation to integration” (Winzer, 1993).

In response to increased pressure due to several court challenges, Congress passed the Education for All Handicapped Children Act in 1975 (PL 94-142), which asserted for the first time that it was a governmental responsibility “to provide programs to meet the educational needs of handicapped children in order to assure equal protection of the laws” (Congressional Research Service, 1975). Prior to the passage of PL 94-142, it was estimated that only one in five children with disabilities were educated in U.S. schools (Individuals with Disabilities Education Act, 2000). By 2000, around 6 million students were receiving some form of special education services. The act was reauthorized in 1997 as the Individuals with Disabilities Education Act, and to this day ensures that all handicapped children ages 3 to 21 remain educated in the “least restrictive environment” to the maximum extent appropriate and have special education and related services “designed to meet their unique needs” (U.S. Department of Education, 2011, p. 3).

Special education services, however, are some of the costliest services provided by school districts. Nevertheless, federal law requires free appropriate public education in the least restrictive environment for children with disabilities, regardless of cost (New America Foundation, 2011). Private schools do not neglect the needs of the exceptional child, but the vast resources of the government means that such students will be primarily educated in public institutions for the future. This fact creates something of a dilemma. There are countless families who would like to send their children with special needs to faith-based schools, but because these schools do not have the economic strength to accommodate as many of these students as they would like, these youth often end up in public schools. Many parents, in fact, believe that their special needs child will not receive the individual attention that they need in the public schools, so they choose to homeschool them (Jeynes, 2012). One could make an argument that federal and state governments should be more committed to the welfare of these children across all sectors, not merely by setting the regulations that they already have but by also demonstrating a greater commitment to provide more funding for these children than the private school sector.

In spite of this valid point just mentioned, faith-based schools must adapt to the current reality that the U.S. government appears far more concerned about the welfare of public school students

than American school students more broadly defined. There are two actions that religious schools can take to better accommodate the needs of special needs students. First is to develop a more coordinated effort to educate the government about how its various levels (federal, state, and local) often view supporting students with special needs in faith-based schools as something of an afterthought. As long as government funding is designated the specific purpose of serving special needs students in faith-based schools, it is not only constitutionally permissible but also the government's responsibility to help facilitate the education of all the nation's special needs students. This does not mean that governments should fund all of the facilities in faith-based schools, but it should do more to fund some of the most foundational and vital. The reality is, however, that for this to take place, faith-based schools will need to make more of a coordinated and concerted effort to petition various levels of government. As it is, typically faith-based teachers make just 70% of the salaries that public school teachers do, which places their salaries just barely above the poverty level (National Education Association, 2010; U.S. Department of Education, 2011). These teachers cannot be expected to sacrifice any more, especially when nearly all of the tax money dedicated to special needs students goes toward those who are in the public sector and not to those in the private sector (Wells, 2002).

Second, faith-based schools should coordinate their efforts and pool their resources so that they can do more with what little they have. For example, clearly not every religious school has the financial backbone to be able to communicate in a special manner with deaf students (Barone, 2008; Peterson, 2006). Nevertheless, religious schools can learn from the example of Christian colleges and universities, which in some cases are pooling their resources and designating that one of them will be a strong law school, for example, rather than having three mediocre ones. In the same way, faith-based schools would be wise to pool some of their funds, especially if they are in the same denomination or faith, and designate certain schools as centers for helping students with particular kinds of special needs. This strategy will particularly work well in cities and will enable religious schools to better assist these students.

THE IMPORTANCE OF VIEWING EDUCATION HOLISTICALLY RATHER THAN IN THE USUAL COMPARTMENTALIZED WAY

For much of the last century Americans have frequently viewed schooling in a compartmentalized rather than holistic way. Many of Dewey's Progressive supporters, in the early decades of the 20th century, sought to create an educational monopoly, even going so far as to pass laws prohibiting religiously funded instruction (Cremin, 1988). Such prohibitions, while sometimes interpreted as an extreme measure during World War I, have their philosophical roots run in an attempt to create a single, unified American culture (Croly, 1909). Admittedly, part of the reason for the compartmentalization that has developed is the issue of funding. Since the days of Horace Mann, public school advocates have argued for the public funding of education (Rippa, 1997). By the late 1800s taxes had risen to such a degree that most Americans found it difficult to afford taxes and still send their children to faith-based schools (E. A. King, 1964; Peterson, 2006).

Clearly, monetary issues can create friction in the educational sphere. Because of this, public school advocates need to realize that there has been a radical change in context between the times of Mann and Dewey and the contemporary situation. The wooden adherence to the secular direction of this tradition is out of place now that the balance of power in this situation is reversed,

in favor of public schools rather than in favor of faith-based schools. People like Jefferson, Mann, and Dewey were arguing for a publicly funded, nonreligious educational system in a period dominated by private Christian institutions (Cremin, 1982, 1988). This simply is not the case today; the overwhelming majority, around 90%, of primary and secondary students are in public institutions (Broughman, Swaim, & Hryczaniuk, 2011; National Center for Education Statistics, 2008).

Some of the most iconic images of the relationship between religious and the public schools are those of Thomas Nast, as published in *Harper's Weekly* in the 1870s (Nast & St. Hill, 1974). Nast penned cartoons that warned of religious, mostly Roman Catholic influence, dominating the public schools (Keller, 1975). Commentators often bandy about a similar rhetoric regarding the need to defend the American education systems against religious influence today. Copious numbers of public school educators frown on the idea of faith-based schools and school choice programs that would relieve some of the tax burden placed on those of low SES (Berliner & Biddle, 1995; Bracey, 1997). Some of the most iconic images on the relation between religion and the public schools are those of Thomas Nast, published in *Harper's Weekly* in the 1870s. Nast's fears of the likelihood of any specific religious sect capturing the public school funding base are remote, when almost every school-age child attends public schools. Rather than continue this rhetorical struggle between secular public and private religious schools, with each striving to monopolize power and control, it may be more constructive to consider the educational system as a whole, to envision American education as based on a public-private model.

Using the perspective of the whole health of the system, rather than whether a school is public or private, may help to improve both access and excellence while also encouraging a system more consistent with democratic principles. In addition to showing that public and private schools are not antithetical, but rather constituent parts of a larger, mixed system, such a system could also encourage both healthy competition and collaboration among diverse forms and ideas. The current system, which is dominance by secular public schools, in the view of many scholars increases separation among worldviews, as minority positions are either silenced within the public institutions, or forced to withdraw and create either their own institutions or to homeschool (Hudson, 2003; Kessler, 2010).

In addition to asking whether public or private education is more effective in inculcating knowledge to the next generation, it is necessary to see which future vision is most consistent with American principles. The vision of a common school, which features children of all ethnicities holding hands in a circular dance, is one dear to many hearts. But Americans have learned from their nation's long historical experience, realizing that imposed uniformity drastically limits freedom (Postman, 1996). The Founders enshrined one form of diversity in the Constitution by dividing sovereignty between federal and state power. Both at the federal and state level the taxing power of the government provide a coercive way to raise resources for public goods (Kurtz, 2010; Peterson, 2006; Wells, 2002). The underlying principles behind such diversity are critically important, however, for they can be equally applied to any government's power, not just at the federal or national level. James Madison's (1788) argument, in *Federalist* 51 (p. 1), was initially focused on the federal constitution, but it can be applied equally within states:

In a free government the security for civil rights must be the same as that for religious rights. It consists in the one case in the multiplicity of interests, and in the other in the multiplicity of sects. The degree of security in both cases will depend on the number of interests and sects; and this may

be presumed to depend on the extent of country and number of people comprehended under the same government.

Madison considered the best safeguard of public rights to be broad competition, especially between economic interests and religious positions. Liberty is best preserved, in this view, in competition, and not in any monopoly of power. The founding fathers also these principles in the limitations on federal power found within the Bill of Rights.

The history of the world is replete with examples of what happens when one sponsor of education or government obtains a prodigious amount of power. For example, in the early twentieth century, facing pressure from Progressives and nativists, a number of states passed laws prohibiting non-public schools. In 1922, a coalition in Oregon brought an initiative, and the voters passed a referendum, enacting an amendment to Oregon's compulsory education act. The amendment required all children between the ages of 8 and 16 to attend public schools (Cremin, 1988, p. 552). Although primarily targeted against private religious schools, the amendment also impacted private military academies and other such institutions.

The U.S. Supreme Court overturned the Oregon law in *Pierce v. Society of Sisters* (1925). A unanimous court held Oregon's law "repugnant to the Constitution" and therefore void, because it conflicted with "the right of the parent to choose schools where their children will receive appropriate mental and religious training."

"The fundamental theory of liberty upon which all governments in this Union repose excludes any general power of the state to standardize its children by forcing them to accept instruction from public teachers only. The child is not the mere creature of the state; those who nurture him and direct his destiny have the right, coupled with the high duty, to recognize and prepare him for additional obligations." *Pierce v. Society of Sisters*, 268 U.S. 510, 535 (1925)

The Court enshrined the principle that "the child is not the mere creature of the state," nor is the state competent to "standardize its children" under a monopoly of public education.

When discussing the relationship between public and private religious schools, one needs to consider whether it is consistent and in the best interests of American democratic and republican principles to have an overwhelmingly unitary system of education, or one that supports and even encourages diversity and competition. *Pierce* provides one constitutional prohibition, but almost 90 years after *Pierce*, 90% of school-age children are still in public schools (Council for American Private Education, 2011). Although private religious schools are not prohibited, numbers like these suggest that they are strongly discouraged, thus dramatically limiting the diversity and institutional pluralism of American education.

The rationale behind *Pierce* and other aspects of American political and educational philosophy suggest that a ratio of 9:1 students, which is roughly the ratio between youth attending public and private schools is not conducive to democratic pluralism, educational access, or even excellence. It may be that one way out of Nast's vision of "sectarian bitterness" would be to shift that ratio, so that perhaps 20% or even 25% of America's school-age children studied in nonpublic schools. One of the essential things that private religious schools could demonstrate to their current and potential pupils is that public schools are not the only schooling option; indeed, that these private schools are self-limiting, not seeking monopoly power, but positively eschewing the desire for monopoly (Mann, 1957).

Concurrently, one could also argue that those connected with faith-based schools ought to be more concerned about the success of public schools. The temptation for faith-based educators to feel overwhelmed by the decreasing percentage of schoolchildren attending religious schools is understandable. Without the tax-based dollars available to public school teachers, faith-based instructors can quickly conclude that the American schooling system is skewed against Christians, Jewish people, and those of other faiths (Kurtz, 2010; Peterson, 2006; Wells, 2002). But resenting the near monopoly of the public school system will not help matters. Rather, setting examples for public school teachers regarding how best to view education more holistically may be the best way to encourage a transformation in the views of public educators. This can begin by both caring more about the quality of public education and learning from some of its strengths, even as public school leaders need to develop the same attitudes toward faith-based schools.

ACTIONS THAT CAN BE TAKEN TO BENEFIT FROM THE STRENGTHS OF THE RELIGIOUS AND PUBLIC SCHOOL SECTORS

Americans Should Be Concerned About the Declining Number Religious Private Schools, Especially as This Affects the Achievement Gap

The growth of the public sector and the dominance of the public schools in education have yielded two realities. First, those in the public schools tend to limit educational solutions to the public sector, which leaves private religious schools almost entirely overlooked as potential partners in crafting solutions to problems such as the achievement gap. Second, taxation has produced a financial chokehold on a myriad of religious private schools (White House, 2008). Ironically, with this eventuation American society may be truncating one of its best hopes to reduce the achievement gap.

As one would only expect, the private schools under the most severe pressure are usually religious schools operating in some of the poorest sections of the country, for example, the inner city and rural areas (Anitt, 2003; Peterson, 2006; Steinfelds, 2003). According to White House estimates, during the 2000 to 2006 period, 1,162 inner-city faith-based schools were closed and nearly 425,000 students were lost, mostly due to insufficient funding (White House, 2008). By definition, these schools were not founded with the goal of making a profit (Hoffer, 1997; Peterson, 2006). This is not only axiomatic, because churches and other religious organizations are non-profit organizations, but because efforts to school in these areas are viewed as a divine and altruistic attempt to help those who are less fortunate (Hoffer, 1997; Jeynes, 2003a, 2006; Peterson, 2006).

The White House Summit on the Reduction of the Achievement Gap

The problem of the closure of faith-based schools in the inner city and other urban areas was ostensible enough to push then-president George W. Bush to call for a White House summit to address this problem in 2008 (White House, 2008). At the summit, President Bush and the nation's leading researchers and political and economic thinkers all converged to speak on the need for faith-based schools in the inner city (Jeynes, 2008a; White House, 2008). Many

remarkable findings emerged out of the White House summit that still significantly enlighten today's dialogue regarding faith-based schools' place in the education of children of color. Perhaps the most publicized result of the White House summit surrounded evidence indicating that faith-based schools reduce the achievement gap by approximately 25% or more, even when one adjusts for SES (White House, 2008). Indeed, via the examination of nationwide data sets and meta-analysis, it is now apparent that African American and Latino children attending faith-based private schools perform higher academically than their counterparts in public schools (Hoffer, 1997; Jeynes, 1999, 2008a). Moreover, the achievement gap between African American students and Latinos, on one hand, and White students, on the other hand, is about 25% narrower in faith-based schools than it is in public schools (Jeynes, 1999, 2003a, 2008a). What this means is that it is a greater relative advantage for African American and Latino students attend faith-based schools than it is for White students (Jeynes, 1999, 2003a, 2008a).

The results of nationwide data sets and meta-analyses also indicate that the socioeconomic achievement gap is about 25% narrower at faith-based schools than it is in public schools (Jeynes, 1999, 2003a, 2008a). In fact, the data indicate that religious private schools benefit the lowest SES quartile of students the most, the second lowest quartile of these youth the second most, and the highest quartile of students the least (Jeynes, 1999, 2003a, 2008a).

There is little question that the set of results for both the racial and socioeconomic achievement gap appear to be the ideal for the alleviation of this social challenge (Jeynes, 1999, 2003a, in press). That is, it appears that one of the most accessible methods to narrow the achievement gap would not require billions of dollars of additional government funding, but rather simply facilitating schools of faith to do what they already do quite well. Nevertheless, one should point out that it would be unwise to assume that these results apply to all schools of faith. Nearly all the schools of faith in the United States are Christian (U.S. Department of Education, 2010). Therefore, nearly all the schools available in the nationwide data sets are Christian ones.

Increased Competition Should Be Encouraged

There appears to be a growing consensus on both sides of the political and educational aisles that increased educational competition is a worthy goal (Chubb & Moe, 1990; Glenn, 2011). It is likely not quite the panacea some conservatives predicted, but one sign that it could likely help is that virtually no one states that it will hurt achievement. Indeed, this is why the government has aggressively fostered the growth of public charter schools. The climate of the debate over school choice has dramatically changed over the past few years, with the continuance of the American economic malaise and an ever-increasing level of national debt, which ultimately threatens the nation's security. The reality of the matter is that the government has done a great deal to help the nation's schools and in the eyes of many, the results have not inspired confidence. Consequently, Americans must either become more creative about educational solutions or face the real possibility of ongoing disappointment. With this scenario in mind, including private religious schools in the school choice mix may be an idea worthy of consideration. With state governments across the nation on the verge of bankruptcy and many of them spending almost half their budget to support public schools, the government's role in education may be overextended. Allowing faith-based schools to shoulder greater amounts of responsibility for the nation's schools, especially when they operate much more efficiently, would likely save the state and federal governments

a prodigious in the long run. Although it may take the government a few years to realize it, increasing school choice to include private schools actually occur from out of sheer budgetary necessity. Indeed, such an action, which could potentially make the public-private-school ratio a more balanced 75%:25% rather than 90%:10%, may produce major benefits for the American school system. One should recall that a government's purpose in this conception is to increase competition, not artificially and prematurely limit it by enforcing monopoly power. It would seem that it is in the best interests of American democracy to have a variety of institutions, represented in the field of education by a healthy mix of secular public and private religious schools.

There Should Be Increased Communication Between Public School and Religious Private School Leaders

As it stands now, public school leaders often meet in an entirely different forum than do faith-based school leaders. If private school leaders ask public school educators to attend one of their functions, few if any from the latter group attend. The opposite is also true. It should therefore come as no surprise that the two groups act almost entirely as two separate entities. It is patent, however, that the nation could gain a great deal if two groups with such common goals could increase their communication with each other. In this case, the mutual learning and strengthening that this special issue suggests could be facilitated. Among the issues that these educators could address include the following.

Character Education

To the extent that character instruction may reduce student misbehavior and harmful actions, how can public schools incorporate character qualities such as honesty, sincerity, love, and responsibility? Clearly, there are a multitude of moral qualities that are universally recognized.

Special Education

What resources could the government provide faith-based schools that would enable them to better help students with special needs? What advice can public special education teachers give to private school teachers that will help them? What ways do children with special needs receive more individual attention in homeschool and private school environments? How might these individualized actions be of help to public school teachers?

Collaboration

Public school leaders can share with those in faith-based schools of the methods of collaboration they have found the most beneficial to increasing the quality of instruction, teacher preparation, and student responsiveness at their schools.

Greater Tolerance to Faith-Based Literature

Religion is an important part of society; the Bible and other sacred texts generally head the list as the most published books in the world. The U.S. Supreme Court allows the Bible and other religious works to be taught in the public schools as long as they are done so in an "objective way" and as part of a "secular curriculum" (*Abington School District v. Schempp*, 1963). Yet one would never know this by perusing the books that are most regularly read in the public schools. How can we increase the impact of religious texts, especially those that have influenced this nation's history, while still adhering to the edicts of the U.S. Supreme Court? Similarly, how can schools increase the availability of "released time," which was instituted in the early part of the 20th century in response to compulsory school laws, as a way to instill religious instruction while still keeping with Mann's ideal of a religiously neutral public school (Mann, 1957)?

These issues are just a small sample of the reasons why there is a great need for public school and religious school officials to communicate more earnestly about the improvement of both institutions. Such communication would be for the betterment of the American school system.

CONCLUSION

The public education sector and the religious private school sector have a great deal to offer each other. In fact, it may be that noneducators see this more plainly than do educators. And just which sector has more to learn from the other may be almost beside the point. That issue can be resolved at a later time. But what is clear from this special issue is that there is great potential for benefit if there is a change in mentality among the nation's school leaders. Americans should work to view education more holistically. The United States is a nation in need of leaders who will humbly work together to build a better array of schools of a variety of kinds, rather than insist that the overwhelming majority abide by a certain model and insist on its superiority. Educational historian David Tyack (1974) made it clear in his book *The Old Best System* that the one-size-fits-all system will not work. If, however, Americans engage in an effort to help all of the existing systems work with each other to help the nation's children, then the United States in the broadest sense will be a stronger nation indeed.

Although educators often emphasize their differences rather than their similarities, ultimately virtually all educators desire for the success of the American school system. It is for this reason that educators have a special interest in the academic success of religious schools. Although debate continues regarding precisely how the presence of religious schools can benefit the American education system, there is no question that the religious school system can make a significant contribution. As educators continue to debate over the next several years, its contributions will undoubtedly become increasingly clear. The results of this study suggest that religious education is a healthy part of the education system in the United States. It should also encourage researchers to examine why students attending religious schools outperform their counterparts in nonreligious schools. Finally, the study also supports the notion that including religious schools in a system of school choice could conceivably help the overall quality of the American education system.

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A Meta-Analysis on the Effects and Contributions of Public, Public Charter, and Religious Schools on Student Outcomes

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An extensive meta-analysis, including 90 studies, was undertaken on the effects of religious private schools, charter schools, and public schools. The study explores the relationship between each of these school types and student outcomes. Additional analyses were done to determine the strengths and weaknesses of these institutions in a broad sense. The results indicate that attending private religious schools is associated with the highest level of academic achievement among the three school types, even when sophisticated controls are used to adjust for socioeconomic status. Students from public charter schools, however, performed no better than their counterparts in other public schools. Supplementary analyses indicate several ways that educators from religious and public schools can learn from one another.

Over the last 45 years, there has been a considerable amount of debate about the effects of faith-based schools and charter schools on the academic achievement of children (Bryk, Lee, & Holland, 1993; Chubb & Moe, 1990; Coleman, Hoffer, & Kilgore, 1982; Garcia, Barber, & Molnar, 2009). Different authors have come at this debate from a number of different angles. Sociologists such as James Coleman have focused on the social capital and cultural aspects of religious private education as an explanation for much of the faith-based school advantage (Coleman et al., 1982; Jeynes, 2003a). Bryk and his associates concurred with Coleman, which pushed the debate to the next logical step of asking whether there are certain moral dynamics and self-disciplinary practices extant in faith-based schools that can also be applied in part within the public sector (Bryk et al., 1993; Jeynes, 2010). To be sure, these debates had a considerable impact on the school choice debate and also whether public schools could at least partially mimic some of the qualities that have made faith-based schools successful both in terms of scholastic outcomes and student behavior (Ireland, 2005). This has, in part, led to the popularity of public charter schools. Public charter schools each exist under a separate charter that allows them to exhibit some of the flexibility that people do not normally associate with traditional public schools (TPS; Bifulco & Ladd, 2006).

With the increasing debate on the value of each of these schooling paradigms, one can easily overlook the broader picture. That is, the goal of Americans at large and educators specifically is to improve the overall system of American education (Boyer, 1995). And if one is to realize this

goal, it is valuable to lay aside one's own particular preferences and ask three simple questions: (a) how do these various classifications (TPS, faith-based, and public charter) compare to one another, (b) what are the strengths and weaknesses of each of these paradigms, and (c) what might they learn from one another so that all these types of schools might benefit?

In the context of the articles presented in the special issue of the *Peabody Journal of Education*, this meta-analysis focuses on the first of these questions but also provides some foundational insights that will help establish an intelligent national discussion on the second and third questions.

REVIEW OF THE LITERATURE: THE JOURNEY THUS FAR

There is little question that by the mid-1960s, the American system of elementary and secondary school education in many respects was much more monolithic than the system had ever been before (Gatto, 2001). Specifically, by the mid-1960s and in every decade since that point, approximately 90% of school children in the U.S. attended public schools (U.S. Department of Education, 2011). Most Americans do not recall living in a nation in which other expressions of education, mostly in the private sector, enjoyed much more influence than they do now. Intellectually, most of the nation's citizenry understand that for those who established the nation's first colleges and schools, they viewed education as the responsibility of the church much more than the state (Jeynes, 2007; Stewart, 1969). Consequently, nearly a century and a half elapsed between the founding of Harvard College (1636) and the first government college in Georgia (1785). Beginning in the 1600s, religious charity schools became the primary mode of instruction to help ensure that people (especially in the North) who desired to receive an education could receive one (Cornog, 1998). Students were only asked to pay what they could afford to pay, which meant that 80% of students paid little or nothing. Charity schools thrived well into the middle 1800s, supported largely by a generous upper class that believed in giving back to society and an economically efficient system that was ultimately improved by an Englishman named Joseph Lancaster (Cornog, 1998).

With the rise of immigration in the 1830s and 1840s, however, it became increasingly difficult for religious charity schools to continue to charge little or no tuition (Bourne, 1870). Concurrently, public school advocates led by Horace Mann, Emma Willard, and Henry Barnard called for an increase in taxes to ensure a continued emphasis on educating as many children as possible (MacMullen, 1991). From about 1837 until the 1860s, many charity schools increasingly turned to government tax money as a supplement to charitable giving. As time went on, this led to the eventual transformation of many charity schools into public schools. This time period also saw an increase in the number of new public schools founded. Despite these changes, by the time of the Civil War, most Americans believed that education was a responsibility of the church and not the government. By 1861, seven of the original 13 states still did not have a state university, although they had a plentitude of Christian colleges (Tewksbury, 1932). Even by 1872, nearly 67% of American students attending high school attended a private school (Jeynes, 2007; King, 1964). Things began to truly change in 1872, when a key Supreme Court case in Kalamazoo, Michigan, upheld public taxation for high schools (King, 1964). This decision set the stage for the number of public high schools that eventually exceeded the number of private high schools. By 1892, about 70% of American high school students attended public schools (Jeynes, 2007; King, 1964).

The percentage of the school-age population attending public schools continued to steadily rise through the remainder of the 1800s and into the 1900s. During this time public schools taught the Bible and allowed prayer, just as the Christian schools did (Westerhoff, 1982). In addition, with the increase of school taxes coupled with the growth of student tuition, parents increasingly sent their children to public schools (Gant, 2005). The nation asked few questions about this continuing trend until the infamous decline in most national and statewide test scores during the 1963 to 1980 period (Wirtz, 1977). It was during this period that issues first arose, as nations that had ordered plenteous literature on American schooling suddenly began to reduce or cease these orders (Jeynes, 2007).

Beginning in the mid-1960s, researchers took note of viable alternatives to TPS. Beginning with the U.S. Supreme Court's 1962 and 1963 decisions to remove voluntary prayer and Bible reading from the nation's public schools, social scientists began examining faith-based schools in particular, especially to the extent that schools, in the advent of these decisions, were now hesitant to risk teaching character traits such as love, forgiveness, the golden rule, and turning the other cheek, which in the views of some were infused with Judeo-Christian values. Some theorists believed that the absence of these teachings might have behavioral and academic effects (Jeynes, 1999, 2003a). Some believed that these teachings and expressions created a culture of love and self-discipline in the schools that might enhance achievement (Jeynes, 2003a, in press; Wirtz, 1977).

In terms of examining the religious school culture and discipline, no two researchers have done a more thorough job than James Coleman and Thomas Hoffer. In their book, *Public and Private High Schools: The Impact of Communities*, Coleman and Hoffer use their examination of the High School And Beyond data set to expound on why they believe that religious schools possess high levels of social capital that enhances student performance and behavior (Coleman, Hoffer, & Kilgore, 1981). Coleman (1988) further elaborated on this concept in his other writings with his development of the "social capital theory." In this theory Coleman posited that students attending religious schools have a higher degree of social capital invested in them. He argued that social capital represents the degree to which certain key members of a society invest their time, energy, wisdom, and knowledge in an individual or institution.

With these findings in mind, some educators have argued that some of the qualities most apparent in explaining the success of faith-based schools could be incorporated into the public school orientation (Hudolin, 1994). Under the guidance of Anthony Bryk, the Chicago public school system was the first public system to attempt to model several aspects of the Catholic school system (Bryk et al., 1993; Hudolin, 1994). Although some factors that contribute to the success of Catholic schools may be difficult to imitate, many social scientists believe that Catholic schools serve as a useful model for the public schools (Bryk et al., 1993; LePore & Warren, 1997; McEwen, Knipe, & Gallagher, 1997).

IMPORTANCE OF DETERMINING WHICH SCHOOL PARADIGMS WORK BEST AND HOW THEY CAN LEARN FROM ONE ANOTHER

In the last two decades the debate has become even more complex as educators and politicians have considered the possibility that a greater level of competition should be allowed among schools. This competition, it is argued, will spur greater advancement. Chubb and Moe (1990)

propounded perhaps the most notable of these arguments in their work *Politics, Markets, & America's Schools*. In this work, the authors ask a very logical rhetorical question. That is, why is it that educators and world leaders almost universally acknowledge that the United States has the best system of university education in the world and yet concurrently these same experts agree that the American system of public elementary and secondary schools is mediocre at best? And indeed, if one looks at the world rankings with any degree of objectivity, on this point at least Chubb and Moe are quite correct. If one examines the world rankings of universities that have been regularly disseminated out of China, Great Britain, and Germany over the last 20 years, American universities dominate the list (BBC, 2010). There is fairly strong recognition that if one states that he or she is a graduate of Harvard University, for example, it is almost equivalent to saying that one attended the best university in the world (BBC, 2010). The only real competition that Harvard, Princeton, and Yale receive for the top slots have generally come from Cambridge and Oxford universities in England (BBC, 2010). Equally impressive is the fact that universities such as Columbia, MIT, Stanford, Duke, Dartmouth, and Chicago are usually in the world's top six to 15 universities (BBC, 2010). Chubb and Moe answered their question by asserting that American public schools do not possess a good reputation, because there is little to no competition in the elementary and secondary school sphere, especially when compared to American universities. Technically, Chubb and Moe insisted that private schools be allowed to compete against public schools. Presidents George H. W. Bush and Bill Clinton especially embraced the idea of competition. However, in the limitations of the real world, they stopped short of allowing this level of competition. Instead, they advocated the establishment and expansion of public charter schools.

The notion that there may be better alternatives to the TPS system, most notably religious private schools and charter schools, has received a great deal of attention. There is an ongoing debate regarding whether students from schools using these alternatives to the TPS paradigm perform better in school. Some researchers believe there is no difference, whereas others assert that students from religious schools outperform public school students simply because public schools have a high percentage of low socioeconomic status (SES) and children of racial minorities (Baker, 1999). Moynihan (1989), however, presented evidence that suggests that the racial distribution of students in religious schools is similar to that found in public schools.

As important as this debate is, there has never been a meta-analysis undertaken that collectively considers TPS, public charter schools, and faith-based schools. A meta-analysis statistically combines all the relevant existing studies on a given subject in order to determine the aggregated results of said research. A meta-analysis is a quantitative approach to statistically summarizing the body of research on a given topic and therefore is extremely practical and useful for educators, academics, government leaders, parents, and students who certainly do not have the time to read all of these individual studies but want insight into what the overall body of research indicates. There are clearly enough studies that have been done on these educational paradigms to make a meta-analysis on this topic very valuable.

Three Research Questions Addressed in This Study

Three research questions, therefore, will rest at the heart of this meta-analysis. The first analysis determines the effect sizes of school types (i.e., religious private and public charter vs. traditional

public schools). This approach does not utilize sophisticated controls that might have changed the effect sizes but instead is designed to obtain a sense of what the overall effects of these schools actually is (Research Question 1). The second analysis assesses effect sizes using sophisticated controls, which reveal the influence of these schools when certain other factors, such as socioeconomic status, race, and individual history, are considered in the analysis (Research Question 2). The third analysis examines the association between practices in these schools with student achievement (Research Question 3).

METHODS

Analytical Approach

This meta-analysis examines the relationship between a school's type (TPS, religious, or public charter) and student achievement. The procedures employed to conduct the meta-analysis are outlined under this heading (Analytical Approach) and the following headings: Data Collection Method, Statistical Methods, Study Quality Rating, and Effect Size Statistics, and Defining of Variables. Three research questions have been addressed by this study. The first question addressed whether there were differences in the effect sizes of school types (i.e., religious private and public charter vs. traditional public schools; Research Question 1). The second research question assessed if effect sizes differ for studies using sophisticated versus less sophisticated controls. The third research question examined if there were associations between practices in these schools with student achievement. Each study included in this meta-analysis met the following criteria:

1. The study had to examine school type in a way that could be conceptually and statistically distinguished from other primary variables under consideration. For example, if a study examined schools generically or if two types of schools were somehow combined (e.g., semireligious with charter), and the influence of school type could not be statistically isolated from the other features, the study was not included in the analysis.
2. The study had to include a sufficient amount of statistical information to determine effect size. That is, a study needed to contain enough information so that test statistics, such as those resulting from a *t* test, analysis of variance, and so forth, either were provided in the study or could be determined from the means and measures of variance listed in the study.
3. If the study used a control group, it had to qualify as a true control group and therefore be a fair and accurate means of comparison. Moreover, if the research utilized a control group at some times but not others, only the former comparisons were included in the meta-analysis.
4. The study could be a published or unpublished study. These criteria reduced the likelihood of publication bias.

Due to the nature of the criteria just listed, qualitative studies were not included in the analysis. Although qualitative studies are definitely valuable, they are difficult to code for quantitative purposes and any attempt to do so might bias the results of the meta-analysis.

Data Collection Method (Coding and Rater Reliability)

To obtain the studies used in the meta-analysis, a search was performed using every major social science research database (e.g., PsycINFO, ERIC, Dissertation Abstracts International, Wilson Periodicals, Sociological Abstracts, etc.). The search totaled 60 databases and focused on studies examining the relationship between school type (TPS, religious, and public charter) and the academic achievement of children from grades prekindergarten to 12. The search terms included religious schools, achievement, Christian schools, Evangelical schools, Jewish schools, Lutheran schools, charter schools, competition, public school choice, magnet schools, community schools, neighborhood schools, Protestant schools, Islamic schools, raising achievement, faith-based schools, socioeconomic, urban schools, urban education, and many other similar terms. Reference sections from journal articles on parental involvement programs were also examined to find additional research articles. E-mails were also sent to each of the education department chairs of the more than 100 Tier-1 research universities in the United States asking if there were any faculty in their department who either had recently completed or were just about to complete a study examining the relationship between school type and student achievement. Although this comprehensive search yielded hundreds of articles and papers on school types and achievement, nearly all of these articles were not quantitative in nature. The research team obtained more than 148 studies that addressed the relationship under study and found 90 studies that had a sufficient degree of quantitative data to include in this meta-analysis.

The study included a number of different characteristics, including (a) report characteristics, (b) sample characteristics, (c) intervention type, (d) the research design, (e) the grade level or age of the students, (f) the outcome and predictor variables, (g) the length (in weeks) of the school type assessment, (h) the attrition rate, and (i) the estimate of the relationship between school type and academic achievement. Two coders, who had been coding for at least 10 years, coded the studies on these characteristics and had 96% agreement on their coding of the following study characteristics.

Report characteristics: Each study entry began with the name of the author of the study, and then the year the study was recorded, followed by the type of research report. Research reports were defined as a journal article, book, book chapter, dissertation, master's thesis, government, school or private report, conference paper, or other type of report.

Sample characteristics: The number of students sampled, their locations, and how they were selected (e.g., via random selection, stratified random selection, or via advertisement).

Intervention type: The experimental or procedural manipulation used, if any, was recorded to determine the effects of school type on student achievement.

Research design: The studies in this meta-analysis were categorized into three basic types of designs. The first design included those studies that employed some type of manipulations to assess the effects of the three school types under study. The second type of design included studies that took cross-sectional measures of the effect of a school type without utilizing any type of manipulation. The third type of design involved the calculation of a correlation coefficient between the school type and student educational outcomes.

For studies that employed a manipulation to measure the effects of the type of school program, the following were recorded: (a) the length, frequency, duration, and total number of training sessions; (b) the method of training (workshop, individual meetings, phone calls, videotape, e-mail communication, newsletter); (c) the type of behavioral or achievement-related outcome

measure (e.g., standardized achievement test; nonstandardized achievement test; or class grades); (d) the unit of analysis (individual student or classroom) at which the effect size was calculated; and (e) the magnitude of the relationship between parental involvement and student achievement.

For the cross-sectional studies and correlation studies, if it was available, the following were also recorded: (a) the socioeconomic status of participants in the sample and (b) the types of behavioral and academic measures that were used.

The grade level or age of the students was coded, including means and standard deviations when they were available.

The outcome and predictor variables from each study were coded to include the different ways that achievement was measured.

Attrition rate: When available, the attrition rate of each study was coded.

The estimate of the relationship between parental involvement and student achievement: The process of the effect size estimation is described in the next section.

Statistical Methods and the Effect Size Statistic

We computed effect sizes from data using t tests, F tests, p levels, frequencies, and r values via conversion formulas provided by Glass and his colleagues (Glass, McGaw, & Smith, 1981). When results were not significant, studies sometimes reported only a significance level. In the unusual case that the direction of these not significant results was not available, the effect sizes were calculated to be zero.

For studies with manipulations we used the standardized mean difference to estimate the effect of school type. The d index (Cohen, 1988) is a scale-free measure of the separation between two group means. Calculating the d index for any comparison involves dividing the difference between the two group means by either their average standard deviation or by the standard deviation of the control group. In the meta-analysis, we subtracted the experimental group mean from the control group mean and divided the difference by their average standard deviation. Hence, positive effect sizes indicated that various factors were successful in reducing the achievement gap. As a supplement to these analyses, we used the Hedges's "g" measure of effect size (Hedges, 1981). Because it employs the pooled standard deviation in the denominator, it customarily provides a more conservative estimate of effect size. Hedges also provided a correction factor that can help to adjust for the impact of small samples.

We undertook the following procedures were for studies that involved cross-sectional measures of the relationship between school type and achievement. For those studies that attempted to statistically equate students on other variables, the preferred measure of relationship strength was the standardized beta-weight. These parameters were determined from the output of multiple regression analyses. If beta-weights could not be obtained from study reports, we retrieved the most similar measures of effect (e.g., unstandardized regression weights).

For studies that involved cross-sectional measures but included no attempt to statistically equate students on third variables, we used the results from the t tests, F tests, and correlation studies provided by the researchers in the study. We used probability values as a basis for computation only if the researchers did not supply any of information on the test statistics just mentioned.

Calculating Average Effect Sizes

We used a weighting procedure to calculate average effect sizes across all the comparisons. First, we multiplied each independent effect by the inverse of its variance. The sum of these products was then divided by the sum of the inverses. We then calculated the 95% confidence intervals. As Hedges and Vevea (1998) recommended, all of the analyses were conducted using fixed-error assumptions in one analysis and applied random-error assumptions in the other. The numerical results listed in this article are based on the more conservative, random-error assumptions, unless otherwise noted. The text does, however, highlight when the fixed-error results differed considerably from those using the random-error assumptions.

If there was more than one effect size presented in the results section, we chose the effect size that was based on that which referred to (a) the overall sample and (b) the purest measure of school type. In the case of results that included clear statistical outliers, the presence of these outliers was acknowledged and then supplemental analyses were run without such an outlier in order to estimate the degree to which the presence of an outlier might have affected the results.

We completed tests of homogeneity to gain a sense of the consistency of specific school type measures across studies.

Study Quality Rating

Two researchers coded the studies independently for quality, the presence of randomization, and whether the schools being examined satisfied definitional criteria for their school type. Study quality and the use of random samples were graded on a 0 (*lowest*) to 3 (*highest*) scale. Quality was determined using the following measures: (a) Did the study use randomization of assignment? (b) Did it avoid mono-method bias? (c) Did the study avoid mono-operation bias? (d) Did it avoid selection bias? (e) Did it use a specific definition of parental involvement?

We calculated interrater reliability by computing percentage of agreement on school type, issues of randomization, and quality of the study. Interrater reliability was 100% on school type, 92% for the quality of the study, 95% for randomization, 96% for avoiding mono-method bias, 94% for avoiding mono-operation bias, and 92% for avoiding selection bias.

Two supplementary analyses were done to include, first, only those studies with quality ratings of 2 and 3 and, second, only those studies with quality ratings of 1 to 3.

Defining of Variables

For the purposes of this study, attending a *religious school* (*faith-based school*) was defined as a student attending a private school that was sponsored by a religious group and was defined to meet certain religious and educational goals. A *charter school* was defined as a public state-legislated school that operated independently from the local school board and operated under a separate charter.

Regarding the factors that will be used to assess some of the distinguishing factors (strengths and weaknesses) between public and religious schools, the following definitions were utilized:

Taking Harder Courses: Defined as students being more likely to take higher level courses such as Advanced Placement and Honors courses, when compared to students at their same academic levels in different types of institutions.

High Expectations: Defined as the manner in which teachers anticipated that students could achieve and accomplish at higher levels, when compared to teachers who instructed students at the same academic levels in other schools.

Achievement Gap: For the purposes of this study, the achievement gap was defined as the difference in academic achievement that existed between the average white student and the average African American and/or Latino student at a school.

Classroom Flexibility: Defined as the degree to which students reported that they could engage in classroom discussions that took place in the class or could easily choose electives as their course choices.

Behavior Measures: Assessments of student actions such as cooperation with teachers, school suspensions, school fights, gang-related behavior, use of illegal drugs, or alcohol abuse.

Types of Analyses and Models Utilized

Two sets of statistical procedures were done to distinguish between studies. First, one analysis distinguished between those analyses that included sophisticated controls in their analyses (e.g., socioeconomic status, race, and gender) and those studies that did not. This was the primary way that studies were distinguished when comparing school types. Second, supplementary analyses were undertaken to distinguish between two models utilized by researchers in their studies. The first model, Model A, included all the studies that examined the impact of religious versus public schools. The second model, Model B, looked at a similar sample of studies but excluded those studies controlling for some of the educational emphases that are often used to explain the differences in achievement. These studies were excluded in Model B, because if a study controlled for some of the specific educational emphases that often explain the academic differences, then they would tend to understate differences that exist between religious and public schools. Specifically, studies were excluded from Model B, if they controlled for whether a school had a high percentage of students on the academic track and if they controlled for parental involvement. The problem with controlling for these variables is that many social scientists believe that the fact that religious schools insist that more of their students be on the academic track and that parents be strongly involved in education are two of the reasons why religious students outperform their counterparts in public schools (Gamoran, 1992; Sander, 1996). Although, for the purposes of this meta-analysis, academics were the primary focus, behavioral variables were also examined.

RESULTS

Table 1 lists the year of the study, some descriptive information, and overall effect size for studies examining the impact of religious schools and charter schools versus their TPS counterparts on academic achievement. The studies are distinguished on the basis of whether the study examined

TABLE 1

Study	Year	Effect Sizes for Religious Schools Without		Effect Sizes for Religious Schools With		Effect Sizes for Charter Schools Without		Effect Sizes for Charter Schools With		Study Distinctions
		Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	
Fass-Holmes, et al.	1996									Examined San Diego charter schools
Graetz	1990		+ .68							Australian study of over 3,000 students
Keith & Page	1985		+ .58		+ .31					Examined children of color
McEwan	2001		+ .57							South American study
McDonald et al.	2007									Examined 3 inner city sites
Lee & Bryk	1989		+ .50		+ .10					Examined HSB Data Set
Lee	1986		+ .44		+ .10					Examined HSB Data Set
Hoffer	1998		+ .44		+ .04					Examined NELS Data Set
Lee	1985a		+ .38		+ .12					Examined HSB Data Set
Hoffer, Greeley, & Coleman	1985		+ .36		+ .20					Examined HSB Data Set
Alexander & Pallas	1983		+ .36		+ .20					Examined HSB & NLS Data Sets
Jeynes	2002a		+ .35		+ .19					Examined NELS Data Set
Raudenbush & Bryk	1986		+ .33		+ .27					Examined HSB Data Set
Lee & Smith	1993		+ .33							Examined NLS Data Set
Hoffer, Greeley, & Coleman	1987		+ .32		+ .18					Examined NLS Data Set
Coleman, Hoffer, & Kilgore	1981		+ .30		+ .20					Examined HSB Data Set
Coleman, Hoffer, & Kilgore	1982		+ .28		+ .19					Examined HSB Data Set
Shokrati, Olson, & Youssef	1997		+ .26							Examined nationwide data sets
Goldberger & Cain	1982		+ .26							Comparisons made in Washington, DC
Regenesis	2000				+ .25					Examined HSB Data Set
Lee, Chen, & Smerdon	1996		+ .25							Examined subset of NELS Data Set
Lauren	2009									Examined NELS Data Set
Taylor et al.	1994		+ .23							Examined Chicago charter schools
Lee & Stewart	1989		+ .22							Examined African American students
Baumeifend & Blumenfeld	1963				+ .22					Examined NAEP Data Set
S. T. Lubienski & Lubienski	2006		+ .22		+ .03 ^a					Matched students
Prince	1960		+ .21							NAEP Data Set
Johnson	1999		+ .20							Assessed 1,197 High school freshman & seniors
Bennett	2009									Examined African American students
Jeynes	2002b				+ .19					Examined Arizona charter schools at 4 grade levels
										Examined NELS Data Set

Lee	1985b	+ .18			Examined NAEP Data Set
Perie, Vanneman, & Goldstein	2005	+ .17			Examined NAEP Data Set
Weaver	1970	+ .16			Examined Latino students
Witte, Wolf, Dean & Carlson	2011		+ .16	+ .05	Examined Milwaukee charter schools
Marsch & Grayson	1990				Examined HSB Data Set
Sutton & de Diveira	1995	+ .15			Examined critical thinking skills
Kamienski	2011				Examined Chicago charter schools
Riordan	1985	+ .14			Examined NLS Data Set
Wolf, Gutman, & Puma	2009		+ .12	+ .13	Examined students who participated in DC Opportunity Scholarship Program
Booker et al.	2007			+ .13	Examined Texas charter schools
Mok & Flynn	1998		+ .12		Studied a large sample of Catholic schools in Australia
Witte et al.	2007			+ .11	Examined Milwaukee charter schools
Brutsaert	1998		+ .10 ^a		Examined elementary schools in Belgium
Bryk & Thum	1989		+ .10		Examined HSB Data Set
Marsch	1991		+ .10		Examined HSB Data Set
Beltz	1980	+ .10			Focused on Seventh Day Adventist
Sass	2006			+ .08	Examined Florida charter schools
Alexander & Pallas	1985	+ .08			Examined HSB Data Set
Schindler	2008	+ .08			European study
Myers	2007	+ .08			Examined 8th graders
Corten & Dronkers	2006				European study
Witte, Wolf & Dean	2011			+ .06	Examined Milwaukee charter schools
Hoxby	2004			+ .06	Compared charter and public schools nationwide in comparable neighborhoods
Bettinger	2005			- .20	Examined Michigan charter schools
Bodenhausen	1989				Examined 272 schools in California
Williams & Carpenter	1990	+ .05			Australian study
Willms	1985	+ .05 ^a			Examined HSB Data Set
Fitzgerald	2000				Examined Colorado charter schools
Lee & Smith	1995	+ .03		+ .01	Examined NELS Data Set
Morgan	1983	+ .03 ^a			Examined NELS Data Sets
Miron	2005				Examined charter schools in Connecticut
Willms	1982	+ .03 ^a		+ .03	Examined HSB Data Set
Mora & Escardibul	2008				European study
Noell	1982	+ .02 ^a			Examined HSB Data Set
Barr et al.	2006			+ .02	Examined charter schools in Newark
P. Carpenter	1985	+ .02			Examined religious schools in Australia
Garcia et al.	2009			+ .02	Examined Arizona charter schools

(Continued on next page)

TABLE 1
List of Studies Used in the Meta-Analysis for Religious Schools, Public Charter Schools, and Traditional Public Schools, the Year of the Study, the Effects, and the Study Distinctions for the Various Studies (Continued)

Study	Year	Effect Sizes for Religious Schools Without		Effect Sizes for Religious Schools With		Effect Sizes for Charter Schools Without		Effect Sizes for Charter Schools With		Study Distinctions
		Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	Sophisticated Controls	
Sassenrath, Croce, & Penalzo	1984									Sample of 98 matched students Examined Georgia charter schools Examined charter schools in several states Examined 214 students' college performance
Plucker, Makel, & Rapp	2007									
Berends et al.	2010									
Schneider	1965	.00				.00			-.05	
Young & Fraser	1990									Study done in Western Australia Examined charter schools in 15 states Examined Philadelphia charter schools Examined both academic and behavioral factors
Gleason, Clark, & Tuttle	2010									
Zimmer, Blanc, & Gill	2008									
Imberman	2011a									
Zimmer & Buddin	2007									Examined California charter schools Examined Pennsylvania charter schools Examined North Carolina charter schools Examined Minnesota charter schools Examined NAEP data Examined both academic and behavioral factors
Miron, Nelson, & Risley	2002									
Bifulco & Ladd	2006									
Lange et al.	1998									
Robelen	2008									European sample Examined 300,000 4th & 8th grade students Examined charter schools run by Mosaica Compared 159 schools Examined NAEP data set Examined Ohio charter schools at 3 grade levels
Imberman	2011b									
Payne & Ford	1977									
C. Lubienski & Lubienski	2007									
Nelson & Van Meter	2003									Examined Michigan charter schools Examined SAT9 data Examined Texas elementary charter schools
DeLuca & Hinshaw	2006									
Braun, Jenkins, & Grigg	2006									
Barnett	2011									
Eberts & Hollenbeck	2001									
Buddin & Zimmer	2005									
Hinojosa	2009									

Note. HSB = High School and Beyond; NELS = National Education Longitudinal Study; NAEP = National Assessment of Educational Progress.

the effects of religious schools or charter schools (or both) when compared to public schools and whether they included sophisticated controls. Table 1 lists the effects sizes of the 90 studies in descending order. Table 1 includes the findings for both Research Questions 1 and 2, where applicable, in the same table.

The results presented here are using analyses based on random-error assumptions. The rationale for presenting these results rather than those using fixed-error assumptions is to utilize analyses that will yield more conservative effect sizes. As one would expect, the analyses bases on fixed-error assumptions yielded somewhat larger effect sizes in the case of religious schools, although there was virtually no difference in the case of charter schools. Table 1 indicates that the effects for religious schools ranged from $+.68$ to $-.07$ standard deviation units, with only one of the studies indicating a negative relationship between attending a faith-based school and educational outcomes. The effects for charter schools showed a considerably greater variation, spanning from $+.75$ to $-.87$ standard deviation units. In the case of charter schools, 53% of the studies indicated a negative association between charter schools and education outcomes, when compared to students attending TPS. The difference between the highest and lowest effects for religious schools ($.75$ standard deviation units) was considerably smaller than for charter schools (1.62 standard deviation units).

Table 2 lists findings regarding the studies included in this meta-analysis, as well as the correlations between the quality of the study and whether a random sample was used, on one hand, and the year the study was done and the overall effect (d), on the other. The results listed

TABLE 2
Means for Measures Assessing the Quality of Study, Whether a Random Sample Was Used, Year of Study, and Sample Size for the 90 Studies Included in the Meta-Analysis

	<i>M</i>	No. of Studies in Each Category	Range	Correlation Coefficient
Year of Study	1995.1	2002+ = 39 1992–2001 = 18 1982–1991 = 26 1972–1981 = 3 before 1972 = 4	1960–2011	
Quality of Study	2.17	3 = 47 2 = 18 1 = 18 0 = 7	0–3	
Random Sample Used	1.81	3 = 25 2 = 30 1 = 28 0 = 7	0–3	
Correlation Between Quality of Study & Effect Size				.12
Correlation Between Study Year & Effect Size				.06

Note. For correlation coefficients, $*p < .05$ and $**p < .01$. Otherwise the correlation coefficient was not statistically significant.

in Table 2 indicate that the mean year of the studies examined was 1995.1. The average quality rating for all the studies examined, using the 0 (*lowest*) to 3 (*highest*) scale was a 2.17. This rating would indicate a relatively high average quality rating, with 1.5 considered average. The ratings for the extent to which the studies featured a random sample (which was also one component of the quality rating) was 1.81 for all studies. Although numerically speaking higher quality studies were slightly associated with positive effect sizes, this amount (.12, $p > .05$), did not reach statistical significance. The correlation between using a random sample and positive effect sizes was also not statistically significant (.06, $p > .05$).

Table 3 indicates the effects for students attending religious schools and public charter schools and examines academic achievement overall and standardized tests specifically, as well as behavioral outcomes. All of the effect size measures for religious schools were statistically significant. In contrast, none of the effect sizes for public charter schools were statistically significant in *either* the positive *or* negative direction. The effect sizes of both U.S. and foreign religious schools for models A and B were .26 standard deviation units for all measures of academic achievement combined and .27 for standardized tests specifically ($p < .01$). For American schools alone the effect sizes were somewhat higher. For both models A and B, the effect sizes of overall achievement were .28 and were .29 standard deviation units for standardized tests specifically ($p < .01$). For those studies that used sophisticated controls, the effect sizes were smaller but were still statistically significant at the .05 level of probability. For both U.S. and foreign schools combined, the effect sizes of religious schools for all measures of academic achievement combined in model B and A were .14 ($p < .05$) and .12 ($p < .05$) standard deviation units, respectively, and .15 ($p < .05$) and .13 ($p < .05$) for standardized tests. For American schools alone the effect sizes were somewhat higher. In this case, the effect sizes for religious schools for models B and A were .15 ($p < .05$) and .13 ($p < .05$) standard deviation units, respectively, for all measures of academic achievement combined and .16 ($p < .05$) and .14 ($p < .05$) for standardized tests.

We also conducted analyses excluding the two studies undertaken by the author. These studies both involved utilizing the National Education Longitudinal Study data set. The exclusion of these two studies had no change on the statistical significance levels of the meta-analysis and had little to no impact on the effect sizes, with the smallest impact being .00 of a standard deviation unit change and the largest impact being .01 of a standard deviation unit change. In the case of analyses that did not include sophisticated controls, for both U.S. and foreign schools combined, the effect sizes for religious schools for Model B were .26 standard deviation units for all measures of academic achievement combined and .26 for standardized tests specifically ($p < .01$). When sophisticated controls were included, the effect sizes were for all measures of academic achievement combined and standardized tests were .13 ($p < .05$) and .14 ($p < .05$), respectively.

For behavioral outcomes, students from faith-based schools were more likely to show positive behaviors than their counterparts in traditional public schools. For those studies that did not utilize sophisticated controls, the effect size was .35 ($p < .01$) of a standard deviation unit. For those studies that did utilize sophisticated controls the effect size was .34 ($p < .01$) of a standard deviation unit.

No statistically significant differences emerged in the case of charter schools. All the studies that were done on charter schools focused on American schools. When the studies did not use sophisticated controls, the effect sizes were near zero, at .01 and when the studies employed

TABLE 3
Effect Sizes for Religious School Students and Public Charter School Students Compared to their Counterparts in Traditional Public Schools for the 90 Studies in the Meta-Analysis

	Religious Schools Overall Academic Achievement	Religious Schools Achievement on Standardized Tests	Charter Schools Overall Academic Achievement	Charter Schools Achievement on Standardized Tests
U.S. & Foreign Without Sophisticated Controls using Model B	.26** (.07, .45)	.27** (.07, .47)	.01 ^a	.01 ^a
U.S. & Foreign Without Sophisticated Controls using Model A	.26** (.06, .46)	.27** (.07, .47)	.01 ^a	.01 ^a
American Schools Without Sophisticated Controls using Model B	.28** (.08, .48)	.29** (.08, .50)	.01 ^a	.01 ^a
American Schools Without Sophisticated Controls using Model A	.28** (.07, .49)	.29** (.08, .50)	.01 ^a	.01 ^a
U.S. & Foreign Using Sophisticated Controls using Model B	.14* (.02, .26)	.15* (.03, .27)	-.03 ^a	-.03 ^a
U.S. & Foreign Using Sophisticated Controls using Model A	.12* (.01, .23)	.13* (.02, .24)	-.03 ^a	-.03 ^a
American Schools Using Sophisticated Controls using Model B	.15* (.03, .27)	.16* (.03, .29)	-.03 ^a	-.03 ^a
American Schools Using Sophisticated Controls using Model A	.13* (.01, .25)	.14* (.02, .26)	-.03 ^a	-.03 ^a
U.S. & Foreign Without Sophisticated Controls using Model B excluding author's two studies	.26** (.06, .46)	.26** (.06, .46)	.01 ^a	.01 ^a
U.S. & Foreign Using Sophisticated Controls using Model B excluding author's 2 studies	.13* (.01, .25)	.14* (.02, .26)	-.03 ^a	-.03 ^a
Behavioral measures	.35** (.11, .59)	.34** (.10, .58)	Not applicable	Not applicable

Note. Effect sizes include those for Overall Achievement and for Standardized Tests.

^aAll the charter schools were in the United States.

* $p < .05$. ** $p < .01$.

sophisticated controls the effect sizes were slightly negative, but not to a statistically significant degree at $-.03$.

Table 4 reflects the same analyses undertaken in Table 3 but includes only those studies rated 2 to 3 in quality. Using the higher quality (2–3) studies, the effect sizes for religious schools were somewhat higher than those in Table 3. All of the effect sizes rose by a range of .01 to .02 standard deviation units, but none of them rose to a degree sufficient to increase the level of statistical significance. For both U.S. and foreign schools combined, where sophisticated controls were not employed, the effect sizes for religious schools for Model B was .28 standard deviation units for all measures of academic achievement combined and .29 for standardized tests specifically ($p < .01$). For American schools alone, the effect sizes were somewhat higher. For Model B, for overall achievement the effect size was .30, and for standardized tests specifically they were .31 standard deviation units ($p < .01$). For U.S. and foreign schools combined, studies that used sophisticated controls for Model B yielded an effect size of .15 ($p < .05$) for all measures of academic achievement combined and .16 ($p < .05$) standard deviation units for standardized tests. For American school studies that used sophisticated controls, for Model B the effects were .16 ($p < .05$) for all measures of academic achievement combined and .17 ($p < .05$) standard deviation units for standardized tests.

For behavioral outcomes, assessing only the studies rated 2 and 3 in the analysis did not change any of the effect sizes. The effect sizes remained .35 ($p < .01$) of a standard deviation unit for those analyses that did not utilize sophisticated controls and .34 ($p < .01$) of a standard deviation unit for those studies that did use sophisticated controls.

Including only the studies rated 2 and 3 in the analysis did not change any of the effect sizes for charter schools. This is largely because so many of the studies of charter schools were rated 2 and were similar to each other in quality.

Table 5 addresses the results of comparisons that are even more specific than those addressed in Tables 3 and 4. Table 5 examines comparisons at the elementary and secondary level, as well as for African American and Latino students. The pattern for Table 5 was similar to that of Tables 3 and 4 in that all of the effect size measures for religious schools were statistically significant. In contrast, none of the effect sizes for public charter schools were statistically significant in *either* the positive *or* negative direction. Numerically speaking, the effect sizes for secondary school students attending religious schools were slightly higher than for those attending elementary schools, but these differences were not statistically significant. When the studies of American elementary schools did not use sophisticated controls, the effect sizes for religious schools for both models A and B were .27 standard deviation units for all measures of academic achievement combined and .28 for standardized tests specifically ($p < .01$). For American secondary schools the effect sizes were somewhat higher. The effect sizes of models A and B for overall achievement were .29, and for standardized tests specifically they were .30 standard deviation units ($p < .01$). For those studies that used sophisticated controls, the effect sizes were smaller but were still statistically significant; however, this time at the .05 level of probability. The effect sizes religious elementary schools for model B and A were .14 ($p < .05$) and .12 ($p < .05$) standard deviation units, respectively, for all measures of academic achievement combined, and .15 ($p < .05$) and .13 ($p < .05$) for standardized tests. For secondary schools the effect sizes were somewhat higher. In this case, the effect sizes of religious schools for all measures of academic achievement combined in models B and A were .16 ($p < .05$) and .14 ($p < .05$) standard deviation units, respectively, and .17 ($p < .05$) and .15 ($p < .05$) for standardized tests.

TABLE 4
Effect Sizes for Religious School Students and Public Charter School Students Compared to Their Counterparts in Traditional Public Schools for the
Studies Rated 2 to 3 in Quality

	Religious Schools Overall Academic Achievement	Religious Schools Achievement on Standardized Tests	Charter Schools Overall Academic Achievement	Charter Schools Achievement on Standardized Tests
U.S. & Foreign Without Sophisticated Controls using Model B	.28** (.08, .48)	.29** (.09, .49)	.01 ^a	.01 ^a
U.S. & Foreign Without Sophisticated Controls using Model A	.28** (.07, .49)	.29** (.08, .50)	.01 ^a	.01 ^a
American Schools Without Sophisticated Controls using Model B	.30** (.09, .51)	.31** (.09, .53)	.01 ^a	.01 ^a
American Schools Without Sophisticated Controls using Model A	.30** (.09, .51)	.31** (.09, .53)	.01 ^a	.01 ^a
U.S. & Foreign Using Sophisticated Controls using Model B	.15* (.02, .28)	.16* (.03, .29)	-.03 ^a	-.03 ^a
U.S. & Foreign Using Sophisticated Controls using Model A	.13* (.01, .25)	.14* (.02, .26)	-.03 ^a	-.03 ^a
American Schools Using Sophisticated Controls using Model B	.16* (.03, .29)	.17* (.03, .31)	-.03 ^a	-.03 ^a
American Schools Using Sophisticated Controls using Model A	.14* (.01, .27)	.15* (.02, .28)	-.03 ^a	-.03 ^a
U.S. & Foreign Without Sophisticated Controls using Model B excluding author's 2 studies	.28** (.06, .50)	.29** (.06, .50)	.01 ^a	.01 ^a
U.S. & Foreign Using Sophisticated Controls using Model B excluding author's two studies	.14* (.01, .27)	.15* (.02, .28)	-.03 ^a	-.03 ^a
Behavioral Measures	.35** (.11, .59)	.34** (.10, .58)	Not applicable	Not applicable

Note. $N = 65$. Effect sizes include those for Overall Achievement and for Standardized Tests.

^aAll the charter schools were in the United States.

** $p < .05$. *** $p < .01$.

TABLE 5
Effect Sizes for Religious School Students & Public Charter School Students, at Different Grade Levels and for Different Ethnicities, Compared to their Counterparts in Traditional Public Schools for the 90 Studies in the Meta-Analysis

	Religious Schools Overall Academic Achievement	Religious Schools Achievement on Standardized Tests	Charter Schools Overall Academic Achievement	Charter Schools Achievement on Standardized Tests
American Elementary Schools Without Sophisticated Controls using Model B	.27** (.07, .47)	.28** (.08, .48)	-.04 ^a	-.04 ^a
American Elementary Schools Without Sophisticated Controls using Model A	.27** (.07, .47)	.28** (.08, .48)	-.04 ^a	-.04 ^a
American Secondary Schools Without Sophisticated Controls using Model B	.29** (.09, .49)	.30** (.09, .51)	.06 ^a	.06 ^a
American Secondary Schools Without Sophisticated Controls using Model A	.29** (.09, .49)	.30** (.09, .51)	.06 ^a	.06 ^a
American Elementary Schools With Sophisticated Controls using Model B	.14* (.03, .25)	.15* (.03, .27)	-.06 ^a	-.06 ^a
American Elementary Schools With Sophisticated Controls using Model A	.12* (.01, .23)	.13* (.02, .24)	-.06 ^a	-.06 ^a
American Secondary Schools With Sophisticated Controls using Model B	.16* (.03, .29)	.17* (.03, .31)	.00 ^a	.00 ^a
American Secondary Schools With Sophisticated Controls using Model A	.14* (.01, .27)	.15* (.01, .29)	.00 ^a	.00 ^a
African American and Latino Students Without Sophisticated Controls using Model B	.35** (.11, .59)	.39** (.12, .66)	.01 ^a	.01 ^a
African American and Latino Students With Sophisticated Controls using Model B	.18* (.03, .33)	.21* (.06, .36)	-.03 ^a	-.03 ^a

Note. Results listed for Overall Achievement and for Standardized Tests.

^aAll the charter schools were in the United States.

** $p < .05$. *** $p < .01$.

TABLE 6
Effect Sizes Indicating Strengths and Weaknesses of Religious Private Schools and Traditional Public Schools for the 90 Studies

Variables Examined	Overall Effect Size	Effect Size for Without Sophisticated Controls	Effect Size for With Sophisticated Controls
Taking harder courses	.19*	.22*	.17*
High expectations	.20*	.23*	.17*
Reduction of achievement gap	.10*	.15*	.07
Classroom flexibility	-.15*	-.16*	-.14*

* $p < .05$.

Among African American and Latino students, and when sophisticated controls were not employed, the effects sizes for attending religious schools were .35 ($p < .01$) for overall academic achievement and .39 ($p < .01$) for standardized tests. When sophisticated controls were applied, the effects sizes for African American and Latino students attending religious schools rather than public schools were .35 ($p < .01$) for overall academic achievement and .39 ($p < .01$) for standardized tests.

In the case of charter schools, once again no statistically significant differences emerged. When no sophisticated controls were employed, the effect sizes for elementary and secondary schools were $-.04$ ($p > .05$) and $.06$ ($p > .05$), respectively. When sophisticated controls were used, the effect sizes for elementary and secondary schools were $-.06$ ($p > .05$) and $.00$ ($p > .05$), respectively.

The third research question, which focused on the association between practices in faith-based and public schools, is addressed in Table 6. For three of the four practices examined, the effect sizes favored students attending faith-based private schools. When sophisticated controls were not used in the study, the effect sizes favoring children from faith-based private schools were .22 ($p < .05$) for taking harder courses, .23 ($p < .05$) for teachers having high expectations of their students, and .15 ($p < .05$) for a reduction in the achievement gap (between White students and African American and Latino students). When sophisticated controls were used in the study, the effect sizes favoring children from faith-based private schools were .17 ($p < .05$) for taking harder courses and .20 ($p < .05$) for teachers having high expectations of their students. The effect size for a reduction in the achievement gap was no longer statistically significant at .07 ($p > .05$), although it was numerically in the same direction as the effect size without the use of sophisticated controls. For all the studies combined, the effect sizes favoring children from faith-based private schools were .19 ($p < .05$) for taking harder courses, .20 ($p < .05$) for teachers having high expectations of their students, and .10 ($p < .05$) for a reduction in the achievement gap.

In contrast, the results for classroom flexibility, as defined in the Methods section, showed an advantage for TPS students when compared to their counterparts attending faith-based private schools. When sophisticated controls were not used in the study, the effect sizes favoring children from public schools was $-.16$ ($p < .05$). When sophisticated controls were used in the study and for all the studies combined, the results were similar at $-.14$ ($p < .05$) and $-.15$ ($p < .05$), respectively.

DISCUSSION

This study suggests rather mixed results for schools that are not TPS. This meta-analysis indicates that students who attend religious schools perform better than their counterparts who are in public schools. They achieve better both in terms of academic and behavioral outcomes. In contrast, youth attending charter schools on average do not perform any better than their counterparts in TPS.

First and Second Research Questions

The findings for the first research question indicate that the effect sizes for religious schools tend to be slightly positive by more than .25 of a standard deviation unit in academic measures and .35 of a standard deviation unit in behavioral measures. For the second research question, which utilized sophisticated controls, the religious school advantage tends to shrink to just below .15 standard deviation units for academic measures. However, for behavioral measures it remains above .33 of a standard deviation unit. Statistically different results emerge even when the study uses sophisticated controls that consider the influence of SES, selectivity, and other factors. Although the differences vary somewhat depending on the age of the students and the measure utilized, the overall academic difference for all the studies combined appears to be approximately two tenths of a standard deviation, which favors faith-based private schools. Behavioral measures, on the other hand, remained roughly the same, at nearly .35 of a standard deviation unit.

In contrast to comparisons with religious schools, statistically significant differences did not emerge when students in public charter schools were compared to children in TPS. Not only were the differences not statistically significant, but the differences were also very close to zero.

These results clearly have significance in their own right, but the findings also have ramifications for the school choice debate. Over the last several decades the school choice debate has emerged as one of the most intriguing discussions in education (Chubb & Moe, 1990; Jeynes, 2000, in press). There is little question that two simultaneous realities caused the school choice debate to intensify. First, student achievement in public schools dropped 17 consecutive years from 1963 to 1980 (U.S. Department of Education, 2011). Second, taxes to support American public schools soared from the 1950s until the present time, far outpacing rises in inflation (U.S. Department of Education, 2011). This made private schools unaffordable to the myriad of citizens who otherwise would have utilized them (Glenn, 2011; Peterson, 2006; Wells, 2002). As a result, the calls increased for some relief from the tax burden imposed on American parents (Chubb & Moe, 1990; Peterson, 2006; Wells, 2002).

Moreover, this deliberation has reached such intense levels that school choice became a central topic of conversation among many of America's foremost leaders (Glenn, 2011; Jeynes, 2007; Wells, 2002). At earlier stages in this debate, most of the focus was on the effects of youth attending faith-based schools versus those attending TPS, controlling for SES and other factors (Bryk et al., 1993; Chubb & Moe, 1990; Jeynes, 2003a). Nevertheless, presidents George H. W. Bush and Bill Clinton concluded that a strategy of limiting school choice to the public sector was an easier and less complex way of incorporating the benefits of additional competition (Glenn, 2011; Jeynes, 2007; Wells, 2002). Consequently, the nation fostered a public school choice program that was designed to incorporate at least some Chubb and Moe's recommendations to make the

U.S. school system more competitive. This decision, made by President Bush and especially President Clinton, caused the number of charter and magnet schools to surge (Imberman, 2011a). Concurrently, however, there was a considerable decrease in the percentage of students attending faith-based schools, particularly in the inner city (White House, 2008). Once again, parents point to the rising rates of taxation to support American public schools as being one of the primary reasons for this trend (Glenn, 2011; Wells, 2002).

There are some reasons for both encouragement and concern based on the results of this study. In terms of encouragement, there are several findings that should inspire or at least calm those individuals most concerned about the state of American education. First, the faith-based sector appears to produce students that have relatively strong academic and behavioral outcomes. And per the theme of this issue of the *Peabody Journal of Education*, one should be able to celebrate the fact that any major sector of education appears to be benefiting students. Second, the faith-based sector appears to be associated with high scholastic outcomes even though it costs far less per student than any of the other competing sectors.

Third, these results suggest that educators would be wise to at least investigate the possibility of expanding school choice programs to include the private sector, not only with educational and behavioral outcomes in mind but also as a means of alleviating budgetary pressures that are commonly exerted upon various levels of government. The reality is that educational expenditures often represent about half of state and local government outlays (State of California, 2006). As a result, the current budgetary crisis that pervades virtually every level of the U.S. government is indubitably impacting the quality of instruction that is available to all American students (U.S. Department of Education, 2011). Ultimately, numerous Americans could be faced with a very difficult quandary. That is, they must resolve themselves to the notion that their children are bound to experience a steady decline in educational standards until America's budgetary problems are resolved or they can open up their minds to a greater diversity of schooling options than is presently the case. As difficult a situation as this might be, one can argue that it is inevitable.

The public sector maintains a near-monopoly on the institutional training and preparation of the nation's youth, which, in the eyes of this author, is too considerable a level of dominance. In addition, in a nation that espouses diversity and variety, there is a certain degree of irony that public educators are often so resistant to various and sundry expressions of nonpublic instruction (Glenn, 2011; Jeynes, 1999). Sometimes it takes a crisis for people to open up their minds and tolerate and embrace other ideas (Gatto, 2001; Jeynes, 2007). Perhaps with the threat of almost perpetual budget deficits facing federal and state governments for as far as forecasters can see, the idea that there are others who would like to help educate the nation's children, who can potentially alleviate some of these fiscal tensions, may not seem so distasteful. It may also be that as public instructors allow those in the faith-based sector a place at the policy table, it might make it easier for teachers in the private sector to have a more open attitude toward those in the public sector as well.

Equally true, however, is that these results also raise certain concerns. First, this meta-analysis accentuates the fact that TPS are likely not satisfying the expectations of many American parents. The TPS rubric does not fare particularly well either when compared to religious schools or public charter institutions. Public school student achievement trails that of their counterparts in faith-based schools and fares no better than youth in charter schools. These results are especially disconcerting when one considers that students in TPS receive far more funding than youth in religious schools and somewhat more than those in charter schools (U.S. Department of Education, 2011). In fact, the gap between public- and faith-based schools is so great that even students in

inner city public schools receive considerably more education funding than the average student at a religious school (Glenn, 2011; U.S. Department of Education, 2011). This is particularly worthy of note because countless public school advocates point to inadequate funding as the primary reason for the underperformance of inner-city children (Berliner & Biddle, 1995; Bracey, 1997). This is not stated to discourage additional funding for education, but it does appear to support the idea of educational efficiency (Glenn, 2011; Jeynes, 1999; Peterson, 2006). Educational efficiency, which focuses on how well school and government officials spend money, may be more important than how much is spent (Jeynes, 2008). These financial facts, in conjunction with the results of this meta-analysis, also suggest that there are likely factors beyond money that explain the religious school advantage in achievement (Jeynes, 1999, 2003b, 2005).

Third Research Question

The third research question regarding the association between practices in faith-based and public schools is worthy of much discussion. In the case of three of the four practices examined, the effect sizes favored students attending faith-based private schools. Nevertheless, the one area where traditional public schools held an advantage (classroom flexibility) is also thought provoking. From the meta-analysis, it appears that teachers from faith-based schools are more demanding and expect higher levels of attainment from their students of equal status. In addition, it appears that the achievement gap is narrower at faith-based schools than it is at traditional public schools. It is conceivable that these three variables may overlap to some extent. That is, the achievement gap might be narrower at faith-based schools, in part, because religious educators are more likely to believe that children, no matter what their color and background, can achieve and reach great potential (Jeynes, 1999, 2003a; Sanders & Herting, 2000). Consequently, they are more likely to have high expectations and insist that these students take demanding courses.

In spite of the possible hypothesis just presented, there are copious alternative explanations for why these findings emerged. For example, Sander (1996) asserted that one reason why African Americans perform better in religious schools is that Christians and Catholics are more likely to see people as equal because they are made in the image of God. Others argue that a sense of purpose in life, which is often associated with faith, is a plausible explanation for the high standards common in faith-based schools (Jeynes, 2003a; McKnight, 2003). Still other social scientists point to Weber's notion of an ethic of a strong motivation to work hard as a means of showing love to others and fulfilling a heavenly calling as possible explanations (Jeynes, 1999, 2003a; Mentzer, 1988). An alternative view, given by some, is that religious schools promote parental involvement more than public schools do (Bryk et al., 1993; Coleman, 1988; Coleman et al., 1982). One might ask why it is that religious schools are more likely to be associated with parental involvement and also caring teachers. Coleman asserted that religious and public schools have very different orientations that result in religious school students eventually being endowed with higher levels of social capital. It should be noted that, to place this discussion in the proper context, the studies included in the meta-analysis naturally varied in their ability to make conclusions based on causality rather than merely correlation. Therefore these hypotheses, although very logical and even plausible, should be understood in this context.

One problem that emerges in studying the effects of religious schools, however, is that increasingly researchers try to control for the very qualities that likely contribute to the academic advantage enjoyed by youth from faith-based schools. Some studies control for whether students took more demanding courses, had teachers with higher standards, or espoused self-reliant attitudes that often lead to the refusal of government help. Some studies examining high school achievement also control for "past achievement." But if attending religious schools for 8 or 10 years, for example, is largely responsible for producing that achievement edge, it seems ill-advised to control for past achievement in such a simplistic way. In addition, should social scientists have blanket controls for parental involvement and whether students are English language learners, when faith-based schools go to great lengths to involve parents and help their students master English.

This meta-analysis attempted to adjust to the tendency for certain studies to "overcontrol" for variables that likely explained, in part, the faith-based advantage. Nevertheless, this meta-analysis quite possibly still understated the effects of faith-based schools to some degree. This possibility may be increased somewhat by the decision to report effects sizes using a random effects model rather than a fixed effects model. The former approach tends to yield more conservative effect sizes than in the latter case. However, it should be noted that in the case of this meta-analysis, the differences between these two models was not especially large for faith-based schools and was almost not existent in the case of public charter institutions. It should be noted, however, that there is perhaps greater wisdom in understating the effects of a given instructional paradigm than in possibly overstating its influence.

It should also be noted that in terms of classroom flexibility, traditional public schools had the edge of faith-based ones. Public school students believed that they had more opportunity to engage in classroom discussion and choose elective courses than their counterparts in religious schools. The difference in the perception of access to elective courses in public schools is probably pretty accurate. By their sheer enrollment advantage and employment base, it seems intuitive that public schools might possess a greater inherent ability to offer a wider array of classes to their students (Gatto, 2001). Concurrent to this reality, though, is the fact that by an emphasis on the basics, a strong academic foundation, and more advanced courses than one typically witnesses in public schools, that focus will tend to yield an emphasis on the basics and intellectual advancement in key subjects and a curriculum that emphasizes preparation for the real world (Coleman, 1988; Gatto, 2001). Indeed, some social scientists have pointed out that a child-centered curriculum filled with a plethora of electives may not best serve the long-term interests of children; therefore a preparation-centered curriculum might be more appropriate. Although one might argue whether there is room for a centrist position in this debate, the meta-analytic data suggest that public schools have a Deweyian child-centered approach versus the preparation-centered orientation espoused by most faith-based schools.

To be sure, faith-based teachers might be more inclined to embrace certain aspects of classroom flexibility than others (Boyer, 1995; Gatto, 2001). That is, to the extent that traditional public schools are more likely to encourage class discussion, religious instructors might find that this component of classroom flexibility might be worthy of emulation. Although technically one might argue that a large amount of time spent on classroom discussion runs the risk of a *de facto* reduction in instruction time, one would think this does not necessarily have to be the case if the discussion is specifically designed to (a) complement the material taught and (b) occur at

intervals of time in which students would absorb more, if there was a brief respite from the usual instruction time (Boyer, 1995).

THOUGHTS FOR CONSIDERATION

What this meta-analysis, and the studies that follow, suggests is that faith-based schools and public schools of various types have something to learn from one another. And to the degree that this is the case, there is something to be said for viewing education more holistically than hoping the best for a single sector and considerably less than that for competing sectors. The nation's children deserve better. It would seem that both the public and private sector can learn from one another, work more cooperatively, and together build a better American school system. For their part, it would seem that public school advocates, including many academics might do well to admit some of the advantages maintained by faith-based schools and see to what extent some of their strengths can be emulated. Similarly, faith-based schools might do relatively well, comparatively speaking, but greater classroom flexibility would likely make their school systems that much better.

Limitations of Study

The primary limitation of this meta-analysis, or any meta-analysis, is that it is restricted to analyzing the existing body of literature. Therefore, even if the researcher conducting the quantitative integrations sees ways the studies included could have been improved, there is no way to implement those changes. A second limitation of a meta-analysis is that the social scientist is limited to addressing the same research questions addressed in the aggregated studies. One can only address the questions that have been asked by researchers and cannot fully manipulate the variables in the same way as if he or she was conducting an original study.

RECOMMENDATIONS FOR FURTHER RESEARCH

There is clearly more that the academic community needs to know regarding the effects of charter schools and religious private schools. For example, Hoxby (2004) as well as D. M. Carpenter and Medina (2011) argued that in school districts with a relatively large number of charter schools, the presence of charter schools causes a more competitive environment. Consequently, they asserted that there is evidence that the educational outcomes of other public schools will then rise. One might recall that Chubb and Moe (1990) argued that if private schools were allowed to compete with public schools, via school choice programs, it would cause public schools to raise their standards and perform at higher levels academically. The assumption by Chubb and Moe, however, is that this would occur because students from faith-based and other private schools achieved at such high levels. It is not intuitive, however, why public charter schools would cause TPS students to increase their educational outcomes. Most studies indicate that the presence of charter schools do not raise student achievement in the TPS environment (Bifulco & Ladd, 2005). Nevertheless, the hypothesis advanced by Hoxby (2004) is interesting and worthy of

further examination. Even if Hoxby is incorrect and charter schools, because they tend to post less than impressive results, have no competitive effect on TPS students, her logic might apply to faith-based schools, if they were allowed via school choice to increase in number.

Second, to the extent that this study suggests that faith-based schools and public schools have qualities to learn from one another, it would be interesting to undertake research designed to examine if there are measurable benefits from educators viewing education more holistically and working together to try to make American schooling more effective in accomplishing its goals. To be sure, this recommendation opens up a broad range of research ideas from both sectors working together to fulfill common objectives to implementing ideas that the other sector does well to actually functioning as a collaborative supporter rather than a competitor. This recommendation for further research could radically change the way many people perceive the American educational landscape.

A third suggestion is based on a statement made by Paul Hill. Hill (2005) noted that “growth can bring dangers if choice is implemented carelessly” (p. 141). This would seem to be a logical statement. But the question remains: What constitutes a carefully planned choice system, especially when so few systems include faith-based schools? It would seem reasonable to assert that all of the claims on either side of the choice debate are mostly hypothetical and have limited merit, unless the nation ceases to be so reluctant to at least experiment with the idea in selected cities throughout the country. After decades of debate on this issue, the time has come to at least experiment to see what hope, if any, school choice programs might have for the quality of American schooling (Jeynes, 2000). And the truth of the matter is that if academics, educators, parents, and other leaders should care what the answer is, if in fact they view schooling holistically.

CONCLUSION

There are several conclusions one can reach from this meta-analysis that are worthy of special attention. First, educators would be unwise to dismiss the contributions of faith-based schools. There is certainly a substantial enough body of knowledge available, as reflected in this meta-analysis, that demonstrates that faith-based schools contribute something vital to the academic well-being of millions of American students. Even if one is not particularly religious, faith-based schools should still be a source of national joy, rather than a target of resentment or of reluctant resignation. The United States is a nation that celebrates diversity, and if it is to conduct itself in a way that is consistent with that claim, it needs to also be tolerant of the presence and successes of faith-based schools (Bryk et al., 1993). Indeed, to the degree that there is evidence that faith-based schools are more likely to reduce the racial and SES achievement gaps, Americans should rejoice that this is taking place without regard to whether the gap is being bridged in a faith-based or public school.

Second, there is evidence that public and faith-based schools can indeed learn from each other. There are certain areas where faith-based schools flourish and others where public schools excel. Religious school educators tend to have high expectations and insist that their students take an advanced course load, whereas public schools are more likely to encourage classroom discussion and the taking of elective courses. It is plausible that teachers from both sectors would do well to learn from these successful practices in the other sectors.

Third, as much as there has been a major government push to encourage the establishment and continuance of public charter schools, it is not clear whether the push toward charter schools is a wise use of time and effort given that it appears that these students, on average, do not show any scholastic benefit. Perhaps it is time to examine alternative means of improving American schools, including extending school choice to include the private sector, most of which are faith-based schools.

Fourth, faith-based educators should have added agency in the policy world. It is apparent that these schools contribute important educational attributes. To actively oppose them not only discourages educational diversity but also diminishes the prospects for the nation's schooling system. Both faith-based schools and public institutions have a prodigious array of ideas that could potentially strengthen the American education system. The leaders and families of the United States have every reason to encourage increased communication and cooperation between these two sectors.

It is not in the best interests of America's children for public school educators to hope that the public sector's percentage advantage goes from 90% of the nation's schoolchildren to 100%. Nor does it benefit the country for those in the private sector to think that the struggles of the public sector are not important.

This meta-analysis should cause us to ask some very practical questions that ultimately could cause the exercise of greater wisdom and cooperation in American education. One might also hope that the results of this meta-analysis will provide greater insight into the increased diversity that many Americans clearly desire in their schools. Concurrently, these data will also provide guidance so that this greater diversity can also increase student achievement.

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A History of Private School Choice

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This article reviews the history of private school choice, from the colonial era to 2012. Taking as its approach an examination of program creation, prominent school choice court cases, and school choice research, the article finds that the evolution of choice has been an iterative process in which legislatures and courts have established constitutionally acceptable structures and procedures of choice. This review also finds that proponents' philosophical and theoretical underpinnings for choice have appeared to shift over time from the position of freedom to economic arguments of educational marketplaces, competitive effects, and increased student achievement.

INTRODUCTION

The concept of private school choice—that is, government-sponsored school choice programs that allow families to choose private schools—is not new. The longest running of such programs originated more than 100 years ago in Maine and Vermont (Maddaus, 1990). But even before those states created their programs, families in the nation's colonial and Revolutionary years chose from among a variety of autonomous schools. Choices began to disappear, however, as “free” public schooling displaced independent schools. The new public schools were hardly nonsectarian institutions but instead reflected the prevailing Protestant ethos of the time. Public schools also manifested the anti-Catholic sentiment common in the 19th and early 20th centuries, the implications of which continue to affect school choice today. As described next, these implications include the creation of a robust parochial school system and the continuous pursuit of government funding for choice programs.

Because sectarian policies were imbedded in state constitutions, state and federal courts have played a critical role in the history of choice, most specifically as the arbiters of what is and is not allowable in government sponsored choice programs. Indeed, over a decades-long course, legislatures and courts have engaged in an iterative process by which the constitutionally acceptable structures and procedures of choice have been established. For that reason, this article examines the history of private school choice through the evolution of programs and policies, as well as the critical court decisions that have contributed to this evolution. This article also

discusses outcomes of various forms of private choice, providing a look at some of the evidence and implications of the ideas and motivations that have shaped the historical trajectory of private school choice.

COLONIAL PERIOD TO 1900

School choice predates America's founding. Children in the colonial era and early republic were educated through a variety of independent schools financed by local communities, churches, and charities (Jeynes, 2003, 2007). In fact, as Jeynes (2007) described, churches—whether founded by Moravians, Lutherans, Friends, Mennonites, Jews, Puritans, Pilgrims, or Quakers—were the administrative centers for the vast majority of educational undertakings in this period. Churches also generally operated the period's elementary and secondary schools. Most schools financed their operation through charity or tuition, which meant all children, no matter their socioeconomic level, could attend school. In addition, missionary societies up and down the East Coast volunteered to teach children in their mission stations for either a small fee or a free-will donation, and numerous charity schools, based on a European model, opened to serve the educational needs of the less fortunate. In keeping with both the ethos of the time and management by the church, the content of these schools was a mixture of “academic” content (i.e., literacy, languages, arithmetic, etc.) and religious teaching, which included prayers, Bible reading, and moral instruction.

The Revolutionary War set in motion a vast expansion of these private and charity schools on a wider scale than during the colonial period, and states and communities increasingly adopted compulsory education laws, which were fulfilled by attendance at the private and charity schools (Jeynes, 2007). As a result of this diverse system of schooling, the young nation enjoyed a high rate of literacy; by 1840, for example, 90% of northerners and 81% of southerners were literate (Simpson, 2004). This “system” of independent schools was not limited just to White students. After the Civil War, there were an insufficient number of schools for Blacks in the South and little prospect for functioning governments that would build them. In response, the Freedman's Bureau, along with a variety of northern benevolent associations, organized schools for recently freed slaves in the states of the former Confederacy (Forman, 2005).

At around the same time, state-controlled schooling—or the “common school”—was on the rise, and by the late 19th and early 20th centuries, compulsory, tax-supported schooling dominated children's education (Jeynes, 2003, 2007). Like colonial and Revolutionary-period schools, the emerging public schools were commonly Protestant in character, requiring, for example, the reading of the Protestant King James Version of the Bible and the recitation of traditional Protestant prayers and hymns in class (Komer, 2009). Given the Protestant fervor of the time, many were entirely comfortable with the pan-Protestantism of the common school movement (Jorgenson, 1987). Catholics, however, were not so content. They found in public schools consistent resistance to their efforts for excusal from reading the Protestant version of the Bible (Tyack, James, & Benavot, 1987), and occasional attempts at compromise—reading both Protestant and Catholic versions of the Bible, for example—were generally unsuccessful.

The tension between Protestants and Catholics in the United States was nothing new, of course. From Luther's Protestant Reformation to the English Reformation to the English Puritans' emigration to the New World, precolonial history is replete with conflict between Protestants and Catholics, particularly in Europe (Ruane & Todd, 2009). This tension and conflict led, in part,

to the foundation of the American colonies, and the dominant groups of the time—particularly Puritans—saw the Catholic Church as oppressive and corrupt (Neal, 1844). Not surprisingly, then, the anti-Catholic sentiment of Puritans and other Protestant groups prevailed in colonial and Revolutionary church schools and later in the public schools of Protestant-dominated communities.

Increasingly, Catholics concluded that to avoid the prevalent Protestant atmosphere of the public schools they would have to create their own schools, ideally with public funding. Such efforts were often resisted by the Protestant establishment (Komer, 2009). Anti-Catholic sentiments eventually found their champion in 1875 in U.S. representative James Blaine of Maine, who hoped to prevent the funding of sectarian (read Catholic) institutions through the adoption of a federal constitutional amendment. Blaine's constitutional amendment fell just short of garnering the required supermajority of Senate votes after passing overwhelmingly in the House. Although he failed in his quest, James Blaine's name has since been applied to state constitutional provisions that have accomplished at the individual state level what he failed to achieve at the federal level (Komer, 2009).

Blaine's effort was accomplished by mandating that territories seeking to become new states include in their initial constitutions provisions establishing a public school system and reserving the proceeds of all federal lands granted to the state for educational purposes to the support of the public schools. These enabling laws also required that public schools be free of sectarian control, which was understood to mean that although the public schools could continue to be Protestant in orientation, Catholic schools could never be supported with public resources. In response to these requirements, the constitutions of every state admitted to the union after 1876 contain Blaine Amendments (Komer, 2009).

Today, the constitutions of at least 37 states contain "Blaine Amendment" language that prohibits state funding of sectarian schools, and some states prohibit the funding of any kind of sectarian institution, such as colleges, hospitals, orphanages, nursing homes, and so on (Komer, 2009). The contemporary consequence of this history is that in recent years, opponents of school choice have used Blaine and other constitutional provisions to challenge the creation of private school choice programs. Thus, what began as an anti-Catholic measure has since evolved to become antireligious. Some choice programs, like the Cleveland and Milwaukee voucher programs and the Arizona and Illinois tax credits, have survived court battles. Others, like the Colorado Opportunity Contract Program and the private school scholarship provision of Florida's A-Plus Program, have not.

1900 TO 1970

As the common school movement firmly established itself and developed into today's public school system, a vibrant private school market developed alongside it. Including not only Catholic schools, but also non-Catholic Christian schools, Jewish schools, and nonsectarian independent schools, these private institutions did not operate with an infusion of public funds but instead operated from private funds procured through tuition, donations, or support from a sponsoring church. Thus, rather than "universal" school choice, the market served those who could afford to pay tuition or who benefited from the generosity of others. Although independent schools lacked public funding and comprised a comparably small educational market, opponents of school choice

nevertheless sought to restrict their growth and even prevent parents from exercising their right to choose such schools, as evidenced by the circumstances of two early 20th-century landmark court decisions.

The first of these decisions occurred in the 1923 Supreme Court case of *Meyer v. State of Nebraska* (1923). The case involved a state statute forbidding public and independent schoolteachers from instructing students in languages other than English. The Court ruled that the law conflicted with the Fourteenth Amendment and infringed upon both the teacher's rights and the rights of parents "to control the education of their own" (*Meyer v. State of Nebraska*, 1923, p. 401). Two years later, in *Pierce v. Society of Sisters* (1925), the Court struck down an Oregon law requiring that all children attend public schools. The case originated from an Oregon ballot initiative passed by voters, the primary purpose of which was to eliminate parochial schools (Howard, 2001). Not surprisingly, private schools—both nonsectarian independent and religious—viewed the initiative as an existential threat and an infringement upon the right of parents to send their children to nonpublic schools. The Court famously decided,

Under the doctrine of *Meyer v. Nebraska* . . . we think it entirely plain that the Act of 1922 unreasonably interferes with the liberty of parents and guardians to direct the upbringing and education of children under their control. . . . The child is not the mere creature of the state; those who nurture him and direct his destiny have the right, coupled with the high duty, to recognize and prepare him for additional obligations. (pp. 534–535)

In both cases, the Court eventually affirmed the right of parents to direct their children's schooling, but the facts of the cases illustrate how opponents of school choice sought to impede the growth of private schools, even to the point of preventing parents from exercising their right to choose such schools.

Although affirmative of parents' rights and the private school market, the cases did not create a circumstance in which all parents could choose these schools. Blaine Amendments continued to prohibit direct aid to schools that would make private education universally affordable. The costs of private schools functionally eliminated the choice for all but families of means and those comparably few who benefitted from private aid. But in 1947's *Everson v. Board of Education of Ewing Township*, the U.S. Supreme Court decided a case that laid the foundation for contemporary private school choice programs and expanded opportunities therein. The case involved a New Jersey law allowing school districts to refund bus fare to schoolchildren who used public transportation to attend religious schools. In the ruling, the Court upheld the district's practice, acknowledging that the aid was not religious in nature and that the same aid was available to all students. The majority stated,

[The First Amendment] requires the state to be a neutral in its relations with groups of religious believers and non-believers; it does not require the state to be their adversary. State power is no more to be used so as to handicap religions, than it is to favor them. (p. 17)

The Court, moreover, upheld the practice because it was primarily for the benefit of the children and not the schools. *Everson* set an important legal precedent, laying the foundation for *Board of Education v. Allen* (1968), which upheld the loan of textbooks to parochial students on grounds similar to *Everson*. It also provided important guidance on the structure of school choice programs—aid to children and families but not to institutions.

Eight years after *Everson*, the concept of a school “voucher” first appeared in a Milton Friedman (1955) essay. Analogizing it to the GI Bill, Friedman described how governments could provide parents with a prescribed amount of money in the form of a voucher that would be redeemable at the educational institution of the parents’ choosing. As part of the program, the government’s role would be minimal—perhaps ensuring minimum standards at the school—and more important, funds would aid the student rather than the school. Such a plan would potentially make school choice attainable by a greater number of families, and not just those of means.

As Viteritti, Walberg, and Wolf (2005) noted, Friedman’s essay was primarily a conceptual piece, lacked any empirical or socio/political/philosophical base, and was written primarily for an audience of economists. Not surprisingly, then, it did not stimulate immediate widespread attention. It did, however, foment interest among some political liberals in the 1960s—like Christopher Jencks and TedSizer—who began advocating for voucher plans for poor and minority students trapped in failing schools (Forman, 2005). With a grant from the Johnson administration’s Office of Economic Opportunity, Jencks created such a plan that eventually saw realization in Alum Rock, CA (discussed next). Although conceptually simple and appealing to at least some on the left, vouchers did not see any serious realization (aside from the already decades-old programs in Maine and Vermont) for almost 20 years. Instead, the first private choice “program” came in the form of a Minnesota tax deduction for educational expenses (Larson & Manzi, 2003). Adopted in 1955, the deduction provides some relief to parents who pay twice for their children’s education—once through their taxes for a service they do not use and once through their pocketbook for one they do. Like Friedman’s voucher scheme, the deduction represents aid to families rather than to schools. In fact, in *Mueller v. Allen* (1983), this was among the reasons the Court upheld the program.

THE 1970s

The 1970s (specifically 1972) saw an attempt at the first modern voucher program. The federal Office of Economic Opportunity initiated a voucher program in schools serving predominately low-income minority students in Alum Rock, CA. Christopher Jencks designed the program as an attempt to give poor students vouchers for use at any participating public or independent school. By the time of its first evaluation, however, plans for the program’s original structure had gone unfulfilled (Blackman, 1975). Only public schools were included, and the program guaranteed school survival and staff employment rights (Weiler, 1974). Rather than a true voucher model, Alum Rock merely decentralized authority to the school level and gave parents the freedom to choose their children’s public school programs (Weiler, 1974; Weiner, 1974). Almost three decades after the program, Sugarman and Kemerer (2000) dismissed Alum Rock as a limited public school choice program.

The 1970s also produced two important legal decisions affecting school choice. The first was the landmark case of *Lemon v. Kurtzman* (1971), which created a new legal standard—called the Lemon Test—for determining the constitutionality of state aid to religious institutions. Before this decision, Pennsylvania and Rhode Island provided salary support for independent schoolteachers. The U.S. Supreme Court ended the practice in *Lemon v. Kurtzman* and set the precedent that state actions “must have a secular legislative purpose . . . its principal or primary effect must be one

that neither advances nor inhibits religion . . . [and] the statute must not foster ‘an excessive government entanglement with religion’” (pp. 612–613).

Two years later, the U.S. Supreme Court overturned several programs in New York that provided facility maintenance funding to independent schools serving low-income students and tax deductions and tuition reimbursements for low-income parents who sent their children to nonpublic schools. The laws were originally enacted to prevent overcrowding in public schools by helping poor students attend an independent school. The Court struck down the programs in *Committee for Public Education v. Nyquist* (1973) and determined that because most of the schools involved in the New York choice program were religious schools, public assistance promoted religion—thereby violating the First Amendment. Thereafter, attempts to create public aid for independent schools would have to be clearly “neutral” in nature.

THE 1980s: SCHOOL CHOICE GAINS MOMENTUM

The school choice movement slowly gained momentum in the 1980s. The decade began with the aforementioned *Mueller v. Allen* decision and ended with the creation of the first tax credit for education expenses. In 1987 the Iowa legislature enacted a tax deduction enabling families earning less than \$45,000 to deduct up to \$1,000 per child for education expenses. Although Minnesota’s deduction preceded Iowa’s by some three decades, Iowa’s law also included a first: For taxpayers who used the standard deduction, the law allowed them a credit of up to \$50 for each child for educational expenses. In 1998, the legislature amended the law to enable families to take a tax credit of 25% of the first \$1,000 spent on their children’s education.

In addition to *Mueller* in 1983, two other Supreme Court decisions with school implications were decided. The first was *Aguilar v. Felton* (1985), which held that New York City’s program that sent public school teachers into parochial schools to provide remedial education to disadvantaged children pursuant to Title I necessitated an excessive entanglement of church and state. A year later, the Court ruled in favor of a disabled Washington student in *Witters v. Washington Department of Services for the Blind* (1986). The student was a blind individual who wanted to use state assistance to attend a religious college. The Court ruled that public funding of his college tuition did not breach the First Amendment’s Establishment Clause because the money did not go directly from the state to the religious institution but to an individual who decided its use.

The momentum built in the 1980s also came from a first-ever source—the president of the United States. Ronald Reagan took note of Milton Friedman’s ideas on school choice—first expressed in Friedman’s aforementioned 1955 essay and later expanded in his famous book *Free to Choose* (Friedman & Friedman, 1980). After his election to the presidency, President Reagan actively supported vouchers and education tax credits, as did the political and religious conservatives who had helped elect the Republican president. He submitted three voucher bills to Congress during his tenure (in 1983, 1985, and 1986). In 1986, he submitted a legislative plan to Congress that emphasized his support for federal tuition tax credits for parents who send their children to private elementary and secondary schools (Seccombe & Zirkel, 1988). Although all of the bills died (Huerta & d’Entremont, 2007), and Reagan’s enthusiasm for vouchers failed to catch on with the very sector of the population they were designed to help—the

educationally disenfranchised—these attempts did represent the first time school choice had received significant national attention (Viteritti et al., 2005).

THE 1990s: THE SCHOOL CHOICE MOVEMENT LEAPS FORWARD

Presidential support for school choice continued when Chubb and Moe's (1990) landmark book on choice, *Politics, Markets, and America's Schools*, gained the praise of president George H. W. Bush. Although much of his administration was spent attempting to burnish his credentials as the "education president" with state and national educational standards (Berube, 1991), Bush eventually embraced school choice in 1992 as part of his reelection bid by proposing \$1,000 scholarships for use by 2,000 poor and middle-income children on education-related expenses at public, private, and religious schools. The effort failed, but the choice movement gained significant traction outside of the nation's capital (Viteritti et al., 2005).

It began with the creation of Milwaukee's now well-known voucher program for low-income students. But unlike attempts at the national level, Milwaukee's program came into existence due to a broad-based coalition led by Annette "Polly" Williams, an African American assemblywoman and a lifelong Democrat; Howard Fuller, a Black Democrat and former superintendent of Milwaukee schools; and Milwaukee mayor John Norquist, also a Democrat (Viteritti et al., 2005). When the program grew to include religious schools, opposition groups filed a lawsuit contending that the program violated both the First Amendment and the Wisconsin Constitution. The Wisconsin Supreme Court, however, upheld the voucher program in 1998 (*Jackson v. Benson*, 1998). Specifically, the court found in favor of the program because it had a secular purpose and did not advance religion or create an excessive entanglement between the state and religious institutions. As of this writing, under the Milwaukee Parental Choice Program, more than 20,000 low-income students continue to use the voucher to attend independent schools of choice (American Federation for Children, n.d.).

Studies on the program have generally shown positive results, and as of the most recent evaluation period, there has been no evidence of harmful effects (Wolf, 2011). In the late 1990s, Greene and his colleagues compared students using vouchers with those who were not offered them and found that vouchers improved outcomes for participants (Greene, Peterson, & Du, 1998, 1999). During the same period, Rouse (1998) conducted a random-assignment study using the data collected on the Milwaukee program in its initial years and found that vouchers produced an improvement of 8 points in math but no apparent difference in reading scores. A decade later, Greene and Marsh (2009) used student-level data to analyze the effects of the program and found moderate but consistently positive results in reading, language arts, and math. In the most recent evaluation of the Milwaukee choice plan (Wolf, 2011), results showed that attending a private high school through the program increases the likelihood of a student graduating from high school and enrolling in college. Although students using vouchers perform at lower levels than Milwaukee Public School students in the younger grades, they achieve at higher levels than Milwaukee Public School students in the older grades. When similar voucher and Milwaukee Public School students are tracked over time, however, their rates of achievement growth are statistically similar.

One of the primary tenets of educational choice is that market pressure will compel traditional public schools to improve. Not surprisingly, then, this has garnered some attention among scholars

studying the Milwaukee program. Hoxby (2001) was among the first to study this theory and found that in a single year, schools exposed to greater competitive pressure made gains that were greater than those of other Milwaukee public schools. Similarly positive results were reported by Greene and Forster (2002), Chakrabarti (2008a, 2008b), and Wolf (2011). Two other studies (Carnoy, Adamson, Chudgar, Luschei, & Witte, 2007; Greene & Marsh, 2009) also found generally positive effects due to competition, although the improvements seen in the public schools did not appear dependent on the proximity of private schools to public schools—a common measure of the effects of competition.

Five years after Milwaukee created its choice program, the Ohio legislature enacted the Cleveland Scholarship and Tutoring Program, which allowed parents to use vouchers worth up to \$3,450 for independent school tuition. Like the Milwaukee program, the Cleveland program also enjoyed broad-based support. Among its leaders was Fannie Lewis, a Black city council member from Cleveland (Viteritti et al., 2005). Today, the program serves almost 5,300 students (American Federation for Children, n.d.). Compared to the Milwaukee program, studies of Cleveland's voucher program are decidedly fewer, but the results are generally similar. Two studies in 1999 found that participating students scored as well as or better than their peers in public schools (Metcalf, 1999; Peterson, Howell, & Greene, 1999). A more recent multiyear study by the official state evaluator reported that students in the voucher program performed at about the same level as their district school peers (Indiana Center for Evaluation, 2003). In addition to studies of effects on student achievement, at least one study has examined the competitive effect of choice on Cleveland public schools. Forster (2008b) used regression analysis to examine annual test score changes in public schools where students were eligible for vouchers. He found positive effects in math scores for fourth- and sixth-grade students, positive effects in reading scores for sixth-grade students, and no visible effect in other grades.

As in Milwaukee, Cleveland's program generated lawsuits from opponents. These lawsuits eventually culminated in one of the most important school choice-related Supreme Court decisions of the decade. In *Zelman v. Simmons-Harris* (2002), the Court concluded that the use of public money to fund tuition at independent and religious schools does not violate the Establishment Clause of the Constitution as long as parents decide where the scholarship is used. Given the range of options and the responsibility of the parent to choose from among them, the Court concluded that the Cleveland program is neutral with regard to religion—even though most voucher recipients chose faith-based schools. In the majority's decision Chief Justice William Rehnquist wrote, "We believe that the program challenged here is a program of true private choice, consistent with *Mueller*, *Witters*, and *Zobrest*, and thus constitutional. As was true in those cases, the Ohio program is neutral in all respects toward religion" (p. 653).

At the end of the decade, Milwaukee and Cleveland's city voucher programs were joined by two statewide voucher programs in Florida: Opportunity Scholarships for students in schools that have failed state assessment benchmarks in 2 out of 4 years and the McKay Scholarship Program for students with disabilities. In 2006, the Florida Supreme Court struck down the independent school transfer option, ruling it violated the state constitution's "uniformity clause" (*Bush v. Holmes*, 2006). Since then, students have only the option of attending higher performing public schools. The ruling had no impact on the McKay Scholarship Program, which enables more than 21,000 students with disabilities to attend a school of choice (American Federation for Children, n.d.).

Studies of Florida's Opportunity Scholarship program have almost exclusively examined the competitive effects of choice on public schools. In the first study, Greene (2001) examined the

impact of the mere threat of vouchers on schools in danger of becoming eligible for vouchers if they did not improve. He found that schools reporting particularly poor student performance on state assessments and thereby receiving an F grade on school accountability reports, which would make students in such schools eligible for vouchers if the school received another F grade, made much larger year-to-year gains than schools that received a D. Similarly, Chakrabarti (2004) compared the improvements made by F schools under the Opportunity Scholarships program with improvements made by schools in the lowest performance category under the state's previous school evaluation system, which had no voucher component. Chakrabarti found that F schools made larger gains than those of D schools under the Opportunity Scholarships program, whereas under the previous system, putting a school in the lowest performing category did not improve its performance relative to schools in the next lowest performance category. Greene and Chakrabarti's results were confirmed in subsequent analyses by Figlio and Rouse (2006); Rouse, Hannaway, Goldhaber, and Figlio (2007); West and Peterson (2006); Chakrabarti (2007, 2008a, 2008b); and Forster (2008a).

Specific to the McKay Scholarship Program, one study has examined the competitive effects of the program, and another has studied student achievement. In the former, Greene and Winters (2008) measured the relationship between the academic performance of disabled students in public schools and the number of private schools accepting McKay vouchers nearby. They found a strong relationship between the presence of private schools participating in the McKay program and student achievement improvement. For the latter study, Greene and Forster (2003) compared the experiences of students who attended public schools followed by enrollment in private schools. Students, in essence, acted as their own controls. The authors found that disabled students using Florida's special-needs voucher program received better services and reported better outcomes in private schools than in public schools.

Turning to nonvoucher programs, in 1999 the Illinois legislature approved an education tax credit of up to 25% for education-related expenses. The Illinois Federation of Teachers filed a lawsuit contending the credit conflicted with religious establishment provisions in the Illinois Constitution. The Franklin County Circuit Court dismissed the suit, declaring the tax credit constitutional, citing the U.S. Supreme Court decision in *Mueller v. Allen*. In 2001, the Fifth District Appellate Court of Illinois upheld the circuit court opinion, stating, "The credit at issue here does not involve any appropriation or use of public funds. . . . Funds become available to schools only as the result of private choices made by individual parents" (*Griffith v. Bower*, 2001). Arizona lawmakers created a new kind of tax credit in 1997. The law allows individuals to take a tax credit of up to \$500 for donations to organizations that provide scholarships to students in independent schools. In 2010–2011, 27,476 students received scholarships, the majority of which were based on financial need (American Federation for Children, n.d.). The credit has survived two legal challenges. The Arizona Education Association, Arizona School Boards Association, People for the American Way, and Americans United for Separation of Church and State filed a lawsuit, alleging the credit violated the religious establishment provisions of the Arizona and U.S. Constitutions. On January 26, 1999, the Arizona Supreme Court upheld the tax credit in *Kotterman v. Killian* (1999). Opponents lost a second suit in 2005 (*Winn v. Hibbs*, 2005).

The literature on tax credits and deductions is quite sparse, and empirical evidence within that literature is almost nonexistent (Walberg, 2007). Of the little that has been written, some articles attempt to estimate if tax credits will save governments money or represent a net loss. Murray (2006) and Martinello and West (1988) estimated the former, whereas Frey (1991) concluded

the latter. Others have examined what types of families are likely to benefit from tax credits. Seccombe and Zirkel (1988) used survey data to estimate that 23% of parents would use a tax credit to transfer their children to private schools. Parents from lower socioeconomic backgrounds said they were more likely to do so. Murray (2010) gathered data from parents of actual tax credit scholarship beneficiaries and found that said families were of more modest means than their neighborhood peers. In contrast, Jacobs (1980) and Catterall and Levin (1982) estimated that tax credits would more likely benefit families of greater means. Although no studies examine the effects of tax credits on achievement or the competitive effects of such programs, some authors examine two related types of effects: what happens to private school tuition and whether credits or deductions increase private school enrollment. Specific to the former, several researchers estimate that substantial tax credits would increase demand for private schooling and other social scientists found no such effect (Darling-Hammond, Kirby, & Schlegal, 1985; Huerta & d'Entremont, 2007; Kirby & Darling-Hammond, 1988).

In addition to programs, the eventful decade of the 1990s also saw two important school choice-related cases. In 1993, the U.S. Supreme Court supported public aid to a disabled student attending a religious school in the case of *Zobrest v. Catalina Foothills School District*. The case concerned a deaf child whose parents sought a sign language interpreter under provisions of the Individuals with Disabilities Education Act. Several lower courts ruled with the school district that the parents' request violated the Establishment Clause of the U.S. Constitution. In the end, however, the U.S. Supreme Court ruled that the aid to the student (by providing the interpreter) did not conflict with the Constitution. Chief Justice William Rehnquist, writing for the majority, found that Individuals with Disabilities Education Act creates a neutral government program dispensing aid not to schools but to individual children. In 1997, the U.S. Supreme Court reversed the 1985 *Aguilar v. Felton* decision in *Agostini v. Felton*. At issue, again, was whether public school teachers could instruct at religious schools. The Court found that the practice was not a violation of the Establishment Clause of the First Amendment, so long as the material was secular and neutral and demonstrated no "excessive entanglement" between government and religion.

THE NEW CENTURY UNFOLDS

Private school choice activity in the new century continued apace. Like the 1980s and early 1990s, school choice enjoyed rhetorical and policy support from the president of the United States (Viteritti et al., 2005), and in 2001 Congress expanded the Education IRA component of the Taxpayer Relief Act of 1997 to include K-12 expenses (Huerta & d'Entremont, 2007). Nevertheless, the substantive advances in choice came not at the federal level but in the states.

In 2001, legislatures passed new corporate tax credit programs in Florida and Pennsylvania. Whether for corporations or individuals, tax credit programs operate generally the same way. Taxpayers donate funds to tuition scholarship organizations, which in turn give scholarships to students to attend the schools of their choice. In return, donors take a credit against their tax liabilities, thereby lowering taxes owed. Other states followed suit, beginning in 2006 with new tax credit programs in three states: Iowa, Rhode Island, and Arizona. In 2007, Georgia started a new tax credit program related to scholarship organizations; in 2008, Louisiana governor Bobby Jindal signed into law an individual educational tax deduction; and in 2009, the Indiana legislature adopted a tax credit for individuals or corporations who contribute to organizations that provide scholarships to low-income students.

In addition to tax credit programs, a handful of states also passed voucher programs specifically intended for students with special needs. In 2003, the Ohio legislature enacted a pilot voucher program for students with autism, and in 2005, the Utah legislature initiated the Carson Smith Special Needs Scholarship to help students with disabilities. In 2006, Arizona passed the Arizona Scholarship for Pupils with Disabilities and the Displaced Pupils Choice Grant Program, the latter of which provided scholarships for students in foster care. The Arizona Supreme Court ruled that the programs violated one of the state's Blaine Amendments. In response, the legislature passed "Lexie's Law," a \$5 million corporate tax credit-supported scholarship program to provide scholarships for displaced and disabled students. In 2007, Georgia adopted its own scholarship program for special needs students, and Louisiana and Oklahoma followed suit with programs in 2010.

In addition to voucher programs for students with special needs, three other voucher programs saw realization in the first decade of the new century—two based in states and one approved by the U.S. Congress. In 2006, Ohio adopted a statewide program—Educational Choice Scholarship Pilot Program, or EdChoice—to enable 14,000 students in poor-performing schools the opportunity to attend an independent school. The second, in 2008, was Louisiana's Student Scholarships for Educational Excellence Program, which allows certain students in the Orleans Parish district to apply for a scholarship at a participating private school. The school choice program that drew much attention in the century's first decade was the DC Opportunity Scholarship Program. In 2006, the U.S. Congress passed legislation to provide low-income students in the District of Columbia with a voucher worth up to \$7,500. In 2009, Congress voted to defund the program, but in a last-minute budget deal between President Obama and House Speaker John Boehner, the program was reinstated in 2011 (Klein, 2011).

In the program's evaluation funded by the Institute of Education Sciences, Wolf et al. (2010) found that vouchers improved graduation rates by 12 percentage points. On test scores, the study found that voucher students scored higher on average than the control group, but the difference fell just short of conventional levels of significance. As a result of sensitivity testing, the authors determined that the results might become statistically certain under alternative statistical models that were not chosen for the evaluation at its commencement. A separate study conducted by Greene and Winters (2006), examined how the DC program in its 1st year impacted public schools. The measure of competitiveness was the distance between each public school and the nearest private school participating in the program. They found no significant relationship.

Finally, in the most recent full legislative session as of this writing (2011), seven new programs were created. Oklahoma created the Equal Opportunity Education Scholarship Act, which will provide tax credits to individuals and businesses that donate to nonprofits that distribute private-school scholarships to eligible families. Indiana created a school voucher program for low- and middle-income families, doubled the preexisting cap on the scholarship tax-credit program, and created a tax deduction for any family that pays out of pocket for educational expenses relating to private or home schools. Wisconsin initiated the Racine Parental Choice Program, which provides private school vouchers to assist low-income children in Racine. Ohio created the Jon Peterson Special Needs Scholarship Program to provide private school vouchers to assist children with special needs. Arizona originated the Education Savings Act. This first-of-its-kind program provides for education savings accounts for children with special needs. Students with disabilities can receive 90% of the per-pupil expenditure to spend on tuition and fees, textbooks, educational therapies, and tutoring. North Carolina now offers an individual income tax credit for children with disabilities. The nonrefundable tax credit of up to \$6,000 can be used for educational expenses, such as tuition, therapy, and tutoring. And a school district in Colorado created its own

voucher program. The Douglas County School District, located in a middle-class suburb of Denver, adopted a voucher pilot program open to any district student. The Americans for Civil Liberties Union and other school choice opponents have since filed lawsuits alleging the program violates the state constitution.

CONCLUSION

Among other things, this review of the history of private school choice reveals that although the concept was once a fringe policy idea, a consensus has *slowly* begun to form. The main question is no longer whether choice should be allowed, but instead how it should look (Viteritti et al., 2005). We emphasize slowly because among the other things not thoroughly addressed in this history are the number of failures to create or sustain school choice programs, particularly with regards to vouchers. Those policies that have generated enough broad support for adoption and that have survived legal challenges appear to be programs in which (a) the beneficiaries are families rather than institutions, (b) vouchers are available on a means-tested basis, and (c) the program is neutral with regard to religion. This does not mean, however, that this is a settled issue (see, e.g., Harmon, 2010; Keller, 2009, 2010). Komer (2009) concluded that despite recent holdings by the U.S. Supreme Court, how state courts interpret their Blaine Amendments continues to introduce significant uncertainty into the future of choice programs. This likely means the iterative process between program creation and judicial “refinement” will continue, especially considering the aforementioned new programs in Arizona, Oklahoma, Indiana, and Colorado. Or, as Komer suggested, the U.S. Supreme Court could issue a ruling that compels state courts to interpret Blaine Amendments narrowly enough to allow for voucher programs that benefit families rather than institutions and that are neutral with regard to religion, thereby curtailing the iterative process seen throughout the history of school choice.

Finally, as this history of private school choice illustrates, proponents’ philosophical and theoretical underpinnings for choice have appeared to shift over time. Early advocates advanced choice from the position of freedom—religious freedom or the freedom of parents to guide their child’s education. This impulse continued into the middle half the 20th century but took on an additional focus—freedom from state-imposed educational failure. Indeed, in his books *Capitalism and Freedom* (Friedman, 1962) and *Free to Choose* (Friedman & Freidman, 1980), Milton Friedman argued in favor of school choice in terms of this type of freedom. In the latter book, he wrote,

For schooling, this sickness [of an over-governed society] has taken the form of denying many parents control over the kind of schooling their children receive either directly, through choosing and paying for the schools their children attend, or indirectly, through local political activity. Power has instead gravitated to professional educators. The sickness has been aggravated by increasing centralization and bureaucratization of schools, especially in the big cities. (pp. 151–152)

Political liberals, particularly in the 1960s, also supported choice on the basis of freedom. They established “freedom schools” for black students suffering in substandard schools in the deep South and “free schools” as a reaction against the bureaucratic educational establishment (Forman, 2005). In more recent decades, however, arguments for choice have tended to be built more on economics than freedom. Referring to educational marketplaces, competitive effects, and other economic descriptions, choice supporters describe how choice and competition will

improve public education and increase achievement among both students who use vouchers and those who stay in public schools.

But what happens if market forces fail to produce the expected outcome? One response is to question the efficacy of choice. Citing a failure of choice to produce more than modest outcomes, at least two prominent choice supporters did just that (Ravitch, 2010; Stern, 2008). Another is to question whether choice programs represent true markets. If they do not, then it stands to reason that choice and competition would not produce a significant effect, and, by extension, studies that examine such programs would not provide useful evidence (Merrifield, 2008). Still another response is to return to an emphasis on school choice as a manifestation of freedom. If, as Shakespeare wrote, “past is prologue,” a revision of this article in years hence may find just that.

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Defining and Assessing Spiritual Health: A Comparative Study Among 13- to 15-Year-Old Pupils Attending Secular Schools, Anglican Schools, and Private Christian Schools in England and Wales

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This article argues that the nation's commitment to young people involves proper concern for their physical health, their psychological health, and their spiritual health. In this context the notion of spiritual health is clarified by a critique of John Fisher's model of spiritual health. Fisher developed a relational model of spiritual health, which defines good spiritual health in terms of an individual's relationship to four domains: the personal, the communal, the environmental, and the transcendental. In the present analysis, we make comparisons between pupils educated in three types of schools: publicly funded schools without religious foundation, publicly funded schools with an Anglican foundation, and new independent Christian schools (not publicly funded). Our findings draw attention to significant differences in the levels of spiritual health experienced by pupils within these three types of schools.

INTRODUCTION

The health of children and young people should be of central concern to any nation. The health of a nation's young people is important not only inherently but also as a barometer for the health of the nation itself. During the 1940s and 1950s educational research in England and Wales focused on measuring and monitoring the physical health of young individuals as the nation planned first for survival, and then for reconstruction, after the Second World War (see Francis, 2010). Later in the 20th century, research focused more on measuring and monitoring the mental health of young people, as a range of social problems had been identified that proved damaging to the health of the nation. At the beginning of the 21st century a third domain began to capture research attention, namely, the domain of spiritual health (for review, see Francis & Robbins, 2005). The first objective of this article is to clarify the notion of spiritual health.

Although concern with spiritual health may be conceived as a proper concern for all educational institutions, it may be also conceived as a special concern for schools established by or supported by religious foundations. An established connection between churches and schools has long existed in England and Wales. This historic connection between churches and schools took on a new dimension in the late 1960s with the embryonic development of what has become known as the new independent Christian schools (for review, see ap Siôn, Francis, & Baker, 2009). The second objective of this article is to clarify the connection between churches and schools in the education provision within England and Wales.

The third objective of this article is to chart the empirical research literature concerned with identifying the connection between schools established by or supported by religious foundations and pupils' attitudes, values, and worldviews within England and Wales. This review of existing knowledge will provide a background for data derived from a new empirical study concerned with assessing the spiritual health of 13- to 15-year-old pupils in England and Wales. The study focuses on students attending three types of schools: publicly funded schools without religious foundation, publicly funded schools with an Anglican foundation, and new independent Christian schools (nonpublicly funded).

SPIRITUAL HEALTH

The notion of spirituality has played an increasingly important part in educational theory and educational legislation in England and Wales. The Education Reform Act of 1988 (Department of Education and Science, 1989) enshrined a spiritual basis for education throughout England and Wales by creating a legal requirement that the curriculum of each school should be one that "promotes the spiritual, moral, cultural, mental, and physical development of pupils at the school and of society." Nowhere, however, in initial government documentation was there any attempt to offer a definition of "spiritual development." In the absence of any agreed definition, a considerable literature developed from a range of different perspectives. In an analysis of the educational debate following the Education Reform Act of 1988, Adrian Thatcher (1996) argued that "accounts of 'spiritual development' appear to have proliferated out of control" (p. 118).

In part as a reaction to the sometimes vague and imprecise ways in which the term "spiritual development" has been used in recent years, another research tradition has set out to establish a more rigorous usage of the cognate term "spiritual health." At the forefront of this work is Australian researcher John Fisher. Fisher set out both to establish a coherent conceptual model of spiritual health and to develop a set of reliable and solid psychometric instruments capable of operationalising that model (see, e.g., Fisher, 1998, 2004, 2008).

Fisher began his conceptual analysis by recognising that the concept of "spiritual health" is doubly problematic when one considers the way in which the two terms "spiritual" and "health" have themselves undergone considerable development in recent years. To begin with, Fisher argued that classical definitions of spirituality tended to concentrate on the religious and the ecclesiastical, or on matters concerned with the soul. Current studies in spirituality, however, have tended to adopt much wider definitions, integrating all aspects of human life and experiences (Muldoon & King, 1995). For Fisher, a definition of spiritual health has to make sense within both of these definitions.

Fisher then argued that there has also been a similar widening in the definition of "health." According to Fisher, the medical field has shifted its emphasis from the exclusive treatment of disease to a greater concern for the whole person. For Fisher, a definition of spiritual health needs to recognise the way in which the words "health," "healing," and "wholeness" are all derived from the same root. He cited the definition offered by Coward and Reed (1996) that "healing is defined as a sense of well-being that is derived from an intensified awareness of wholeness and integration among all dimensions of one's being" (p. 278).

Prior to Fisher's work, several attempts had been made to link the two concepts of spirituality and health, most generally within the idea of "spiritual well-being." For example, in setting out to define and measure spiritual well-being, Ellison (1983) suggested that spiritual well-being "arises from an underlying state of spiritual health and is an expression of it, much like the colour of one's complexion and pulse rate are expressions of good (physical) health" (p. 332). Ellison's (1983) Spiritual Well-Being Scale stimulated a great deal of research during the 1980s. The measure proved to be useful both in population studies concerned with mapping individual differences in well-being and in clinical settings. The review of 10 years of work with this instrument, published by Bufford, Paloutzian, and Ellison (1991), provided general support for the reliability and validity of the measure and for the usefulness of the construct over a wide range of studies. The main constraint of this instrument, and of the conceptualisation on which it builds, concerns the explicitly religious context in which it was shaped.

Fisher's aim was both to build on Ellison's (1983) helpful notion of thinking in terms of conceptually discrete dimensions of spiritual well-being and to develop a dimensional model of spiritual well-being that would value both religious and nonreligious perspectives. His solution to this problem was to discuss spiritual health in four domains and to develop a series of tools capable of assessing these four domains (including the Spiritual Health in Four Domains Index).

FOUR DOMAINS OF SPIRITUAL HEALTH

In developing his conceptual framework for spiritual health, Fisher drew on the discussion advanced by the National Interfaith Coalition on Aging (1975), which argued that spiritual health is the affirmation of life in a relationship with God, self, community, and environment that nurtures and celebrates wholeness. Fisher recognised that these four sets of relationships were also mentioned in subsequent discussions of spiritual health. Hateley (1983) wrote about relation to self, integration, and self-esteem; moral development, empathy in the community, and religion; mystery of creation; and relationship with God. Young (1984) mentioned the interrelatedness of body, mind, and spirit within the context of inner peace; relations with and love of others; relation with nature; and God as the focus of belief. Goodloe and Arreola (1992) spoke of meaning and purpose, with self-transcendence; social and spiritual action with others; oneness with nature; and disembodied spirits, abstract, and personal relations with God. According to Hood-Morris (1996), "the spiritual component includes transcendent and existential features pertaining to an individual's relationship with the self, others, and a higher being . . . coupled with interaction with one's environment" (p. 440).

Working with these four sets of relationships, Fisher (1998) analysed the responses from interviews with 98 teachers in a range of state, Catholic, and other nongovernment schools near Melbourne, Australia. On the basis of these analyses, Fisher proposed that spiritual health is

a fundamental dimension of people's overall well-being, permeating and integrating all other dimensions of health (including the physical, mental, emotional, social, and vocational). In addition, Fisher (1998, p. 191) argued that spiritual health is a dynamic state of being, as revealed by the extent to which people live in harmony within relationships in the following domains of spiritual well-being. First, the *personal domain* is concerned with internal relationships with the self. Second, the *communal domain* is concerned with external relationships with other people. Third, the *environmental domain* is concerned with relationships with the physical and human world on both local and global planes. Fourth, the *transcendental domain* is concerned with relationships with those aspects of life that transcend the ordinary everyday account of the physical environment. The transcendental domain embraces matters of ultimate concern, cosmic forces, transpersonal phenomena, and (in traditional theistic categories) God.

Fisher has offered a broad theory of spiritual health and advanced broad definitions of the four domains that he conceptualises as core to his model of spiritual health. Much of Fisher's subsequent research has concentrated on testing different operationalisations of this theory. For example, an early study reported by Fisher, Francis, and Johnson (2002) described the Spiritual Health in Four Domains Index developed for use among teachers. Fisher (2004) described the Feeling Good Living Life Instrument developed for use among children as young as 5 years. It is recognised that, although such instruments provide only approximate indicators of the underlying constructs, the information generated offers useful insights into the spiritual health of groups and of individuals and provides reliable and valid predictors of a wide range of human individual differences.

Building on Fisher's pioneering work, Francis and Robbins (2005) attempted to operationalise the four domains of spiritual health within their survey conducted among nearly 34,000 secondary school pupils. From their questionnaire battery of 128 items, Francis and Robbins selected seven indicators for each of the four domains. At one level, this is an inadequate sample of indicators to represent such broad conceptual categories. At another level, however, concentrating on a small number of well-chosen indicators permits proper care and due weight to be given to the discussion of each one. These four sets of seven items provided the following operationalisations of the four domains.

The *personal domain* is concerned with what young people believe about themselves and with what young people feel about themselves. There are certain recurrent things that young people are likely to say about themselves when they are enjoying a good level of spiritual health within the personal domain. First and foremost, they are likely to affirm their self-worth and to put forward a confident and secure self-image.

The *communal domain* is concerned with what young people believe about those with whom, in one sense or another, they share their lives. There are certain recurrent things that young people are likely to say about others when they are enjoying a good level of spiritual health within the communal domain. First and foremost, they are likely to affirm their relationships and to feel positively about other people. The three key areas of experience that access this dimension of spiritual health among adolescents concern relationships with parents, relationships with friends, and relationships at school.

The *environmental domain* is concerned with what young people believe and feel about their connectedness with the natural, physical, and human global environment. The environmental domain raises fundamental questions about global citizenship and about sustainable development. There are certain recurrent things that young people are likely to say about the world in which

they live when they are enjoying a good level of spiritual health within the environmental domain. First and foremost, they are likely to recognise the importance and significance of global issues.

The *transcendental domain* is concerned with what young people believe and feel about those aspects of life that transcend the ordinary everyday account of the physical environment. The transcendental domain embraces matters of ultimate concern, cosmic forces, transpersonal phenomena, and (in traditional theistic categories) God. In some senses the transcendental domain is more complex to operationalise than the other three domains. The added complexity is a function of the way in which conceptualisation in this area is not independent of fundamental theological assumptions.

Fisher's notion of spiritual health, developed in Australia and in the United Kingdom, resonates well with the broader discussions of the educational implications of religion and spirituality in the United States, as discussed, for example, by Jeynes (1999, 2003).

CHURCHES AND SCHOOLS

Currently, within England and Wales, there are three groups of schools that are closely linked with Christian churches (or to a lesser extent with other faith traditions). Technically the Schools Standards and Framework Act 1998 (Department for Education, 1998) refers to these schools as schools that have a "religious character." These three kinds of schools are state-maintained schools, "traditional" independent schools, and the so-called "new" independent schools. Each of these three kinds of schools has its own peculiar history.

The majority of schools with a religious character are those within the state-maintained sector. These schools trace their origin to the fact that the original initiative for the provision of "public" education in England and Wales came not from the state but from the Churches, through voluntary societies like the National Society founded by the Church of England in 1811 (Burgess, 1958), the British and Foreign School Society founded largely by Nonconformist Churches in 1814, and the Catholic Poor School Committee founded in 1847 (see Chadwick, 1997; Cruickshank, 1963; Murphy, 1971). When the government first voted in favor of public money for schools in 1833 it did so by distributing these funds through the National Society and the British and Foreign School Society. When the Education Act of 1870 established secular machinery to found schools, it did so not to supplant the initiatives of the church-related societies but to fill the gaps within voluntary provision (Murphy, 1972).

Against this background, the major determinant in shaping the current provision of schools with a religious character within the state-maintained sector was provided by the Education Act of 1944 (Dent, 1947). This act acknowledged the Churches' historic investment in schools but also recognised that the Churches were in no position to bring all of these schools up to a required standard for postwar educational reconstruction. The ingenious compromise solution of the Education Act of 1944 was to ensure that the Churches had a statutory role in shaping religious education throughout the state-maintained system and to offer the Churches a choice between two different futures for their voluntary church schools. Voluntary schools were individually given the choice between "aided" or "controlled" status. This choice enabled schools that could afford to retain a high level of independence to do so (aided status), whereas those that either could

not afford such independence or did not desire to retain it could nevertheless retain something of their church-related character (controlled status).

In the case of aided status, the churches were responsible for capital expenditure and retained the right to appoint the majority of their governors and their headteacher, and to provide denominational religious instruction and denominational worship. In the case of controlled schools, the churches were absolved of ongoing financial liability but retained the right to appoint a minority of their governors, provide denominational religious worship, and offer denominational religious instruction for those children whose parents requested it. At the time of the Education Act of 1944, the Nonconformist Churches largely opted out of the church school system, the Roman Catholic Church opted entirely for aided status, and the Church of England went for a mixed economy of aided and controlled status according to local preferences.

The *basic* framework provided by the Education Act of 1944 has remained unchanged by subsequent legislation. Faith schools of this nature currently account for one third of state-maintained primary schools and one tenth of state-maintained secondary schools. The real issue concerning these schools relates to the admissions policy. In principle, the Roman Catholic Church has seen the main purpose of its schools as that of providing an alternative educational system for parents who wish a "Catholic" education for their children. Following the language of the Durham Report (1970), the Church of England has maintained a twin function for its schools: on one hand, the *general* function of serving the nation through the provision of neighbourhood schools, often in single school areas; on the other hand, the *domestic* function of providing a distinctive Anglican education for the children of parents who seek it. At the time of the Education Act of 1944, a small number of Jewish schools claimed voluntary-aided status, and in recent years a small number of Islamic schools have also been added to this category.

The research question presented in this article, formulated within the context of the state-maintained system in England and Wales, concerns the extent to which those church schools with an Anglican foundation (Church of England, or Church in Wales) generate an ethos that may be reflected in different levels of spiritual health among their pupils. The question is of particular interest given the commitment of the Anglican Church, defined in the Durham Report (1970), to fulfil both *general* and *domestic* functions through church schools. As a consequence, the overt religious distinctiveness of church schools may be less obvious in Anglican schools than in Roman Catholic schools in England and Wales.

The "traditional" independent schools with a religious character trace their origins to a wide range of historic initiatives, including those of churches, religious communities, religious societies, and private benefactors wishing to secure a religious connection. Alongside Anglican and Catholic traditional independent schools, there are some well-known Methodist and Quaker schools as well. There is such variability within this sector that a general research question becomes difficult to operationalise.

The "new" independent schools with a religious character trace their origin to a Christian foundation opened in Rochester, England, in 1969 (Deakin, 1989). Within this context, the new independent Christian schools, often associated with the Christian Schools Trust (<http://www.christianschoolstrust.co.uk>), were variously founded by local churches or by a consortium of parents. Such schools set out to offer a radical alternative to the "secular" values of the broad, state-maintained sector of schools. The Islamic community undertook a parallel initiative to found independent schools, some of which were linked by the Association of Muslim Schools

UK. Buddhist and Hindu schools are also among the registered independent schools with a religious character.

A second intriguing research question concerns the extent to which these new independent Christian schools generate an ethos that may be reflected across different levels of spiritual health. The question is of particular interest given the distinctive theological emphasis of these schools. Following Deakin's (1989) analysis of the first 20 years of these new independent Christian schools, the subsequent development of Christian schools in England and Wales has been chronicled (from the insider's perspective) by Watson and MacKenzie (1996), and Baker and Freeman (2005), and (from the outsider's perspective) by Poyntz and Walford (1994), and Walford (2001a, 2001b).

In his attempt to understand the theological and ideological motivation underpinning the independent Christian schools in the United Kingdom, Walford (1995) conducted a series of semistructured interviews with the headteachers of 11 of the 65 schools included in the 1993 address list of the Christian Schools' Trust and received completed questionnaires from 42 of the other 54 schools. Walford's data demonstrated considerable diversity in these schools, but it also demonstrated clear underlying themes that united them. On the basis of these data the following profile was offered by Walford (1995):

These schools share an ideology of biblically-based evangelical Christianity that seeks to relate the message of the Bible to all aspects of present day life whether personal, spiritual or educational. These schools have usually been set up by parents or a church group to deal with a growing dissatisfaction with what is seen as the increased secularism of the great majority of schools. The schools aim to provide a distinctive Christian approach to every part of school life and the curriculum and, usually, parents have a continuing role in the management and organisation of the schools. (p. 7)

Much of the theology currently underpinning the Christian school movement is of the kind that Astley (2002) would describe as ordinary theology. It is couched not in the systematic form of the theological academy but in the direct form of the evangelically-shaped believer. Within this genre good insight into the theological motivation behind Christian schools is provided by an analysis of Baker and Freeman's (2005) firsthand account of their personal involvement in the movement. The new Christian school movement is grounded in belief in a God who takes initiative within the lives of the people of God to bring to fruition the purposes of God. Here is the God who communicates with individuals and with groups through scripture, pictures, and prophecy. Here is the God who authenticates the message through answered prayer, healing, and the release of necessary finances.

CHURCH SCHOOLS AND PUPIL ATTITUDES

The pioneering works by Brothers (1964) and by Lawlor (1965) trace back the empirical studies among pupils in Roman Catholic schools in England and Wales as part of a broader international research agenda concerned with pupil attitudes within Roman Catholic schools. The field then burgeoned from the mid-1970s (for review, see Francis, 2002).

Considerably less is known about pupils who attend Anglican schools in England and Wales. One particularly useful study in this field was reported by Lankshear (2005), who compared the

values profile of six groups of pupils: Anglicans in Church of England schools and Anglicans in nondenominational state-maintained schools, nonaffiliates in Church of England schools and nonaffiliates in nondenominational state-maintained schools, and members of other Christian denominations in Church of England schools and members of other Christian denominations in nondenominational state-maintained schools. The data demonstrated that Anglicans attending Anglican schools recorded higher levels of personal dissatisfaction, higher levels of religious values, and comparable levels of moral values in comparison with Anglicans attending nondenominational schools. Nonaffiliates attending Anglican schools recorded higher levels of personal dissatisfaction, lower levels of moral values, and comparable levels of religious values in comparison with nonaffiliates attending nondenominational schools.

Even less is known about pupils attending new independent Christian schools. One particularly useful study in this field was reported by Francis (2005), who compared the worldviews of those boys attending 19 independent Christian schools (usually providing quite small secondary facilities) with the boys attending the 114 nondenominational state-maintained schools included in the Teenage Religion and Values Project (Francis, 2001). The comparison was based on 136 boys in the independent Christian schools and 12,823 boys in the nondenominational state-maintained schools. Francis (2005) drew the following conclusion from his data: "The data provided by the present study [demonstrate] . . . that the values environment modelled by 13- to 15-year-old boys attending Christian schools is significantly different from that modelled by boys in the same age range attending non-denominational state-maintained schools" (p. 139).

According to these data, boys attending the Christian schools were more likely to be committed to a belief in God and in the inerrancy of scripture. They were more likely to hold a positive view of the church, to support the place of religious education in school, and to reject superstitious beliefs. They were less likely to hold liberal attitudes toward alcohol, tobacco, and sex. They were less likely to be troubled by bullying at school and more likely to respect their teachers. They were more likely to feel good about life and about themselves.

RESEARCH AGENDA

Against this background, the aim of the present study is to utilise Fisher's model of spiritual health as operationalised by Francis and Robbins (2005) in order to compare the profile of Year 9 and Year 10 pupils (13 to 15 years of age) attending three types of schools in England and Wales: new independent Christian schools, Anglican schools within the state-maintained sector, and schools without a religious character within the state-maintained sector. The research design is that of a descriptive study intended to profile the ethos of these three types of schools in terms of the overall levels of spiritual health displayed by their pupils. Differences detected between the three types of school may reflect different admissions policies or different influences exerted by the schools themselves.

METHOD

The number of new independent Christian schools catering to Year 9 and Year 10 pupils tend to be quite small. Baker (2010) gathered data for 461 pupils attending 25 schools in this category.

Comparable data were subsequently provided by 2,565 pupils attending 12 Anglican schools and by 5,346 pupils attending 26 schools without a religious character but within the state-maintained sector.

Participating schools were asked to follow a standard procedure. The questionnaires were administered in normal class groups to all Year 9 and Year 10 pupils throughout the school. Pupils were asked not to write their name on the booklet and to complete the inventory under examination-like conditions. Although pupils were given the choice not to participate, very few declined to do so. They were assured of confidentiality and anonymity.

Sample

Within the new independent Christian schools, the participants comprised 244 male and 217 female students: 230 Year 9 pupils and 231 Year 10 pupils; within the Anglican schools, 1,269 male and 1,296 female students: 1,176 Year 9 pupils and 1,389 Year 10 pupils; within schools without a religious character, 2,635 male and 2,711 female students: 2,937 Year 9 pupils and 2,409 Year 10 pupils.

Instrument

The questionnaire contained 189 items arranged for responses on a 5-point, Likert-type scale (Likert, 1932) comprising *agree strongly*, *agree*, *not certain*, *disagree*, and *disagree strongly*. Following Francis and Robbins (2005), seven items were employed to assess each of Fisher's four domains of spiritual health: personal, communal, environmental, and transcendental.

Analyses

After collapsing the scores recorded on the 5-point Likert-type scale into two categories—combining on one hand the *agree strongly* and *agree* responses and on the other hand the *disagree strongly*, *disagree*, and *not certain* responses—we calculated the statistical significance of the differences in responses between the two groups using the chi-square statistic.

RESULTS AND DISCUSSION

Schools Without a Religious Character

Table 1 establishes the reference point for the study by presenting the profile of the pupils attending schools without a religious character within the state-maintained sector.

The personal domain is concerned with what young people believe about themselves and feel about themselves. The statistics in Table 1 present a mixed message. On the surface things seem to be going well for the majority of young people. Levels of self-esteem and self-worth are high, with only 16% of the young people feeling that they are not worth much as a person. Levels of perceived satisfaction with life are high, with 71% finding life really worth living and 71%

TABLE 1
Schools Without a Religious Character

	Yes %	? %	No %
Personal domain			
I feel my life has a sense of purpose	65	27	8
I find life really worth living	71	19	10
I feel I am not much worth as a person	16	25	59
I often feel depressed	30	21	49
I have sometimes considered taking my own life	18	13	70
I often long for someone to turn to for advice	33	29	38
I am happy in my school	71	17	12
Communal domain			
I am worried about my attractiveness to the opposite sex	45	23	32
I am worried about how I get on with other people	39	24	37
I find it helpful to talk about my problems with my mum	55	18	27
I find it helpful to talk about my problems with my dad	39	23	38
I find it helpful to talk about my problems with close friends	65	16	20
I am worried about being bullied at school	20	18	62
I like the people I go to school with	85	10	5
Environmental domain			
I think immigration in Britain should be restricted	48	31	21
I am concerned about the risk of pollution to the environment	50	26	24
I am concerned about the poverty of the developing world (e.g., Africa)	62	25	13
I am concerned about the risk of nuclear war	40	37	23
There is nothing I can do to help solve the world's problems	20	31	49
I would like to make a difference in the world	66	26	8
There are too many foreign people in this country	51	23	26
Transcendental domain			
I believe in God	22	27	51
I believe in life after death	36	36	29
The church seems irrelevant to life today	32	40	28
I believe in my horoscope	28	31	41
I believe fortune-tellers can tell the future	13	29	58
I believe it is possible to contact the spirits of the dead	23	31	46
Prayer helps me a lot	12	24	64

being happy in their school. Below the surface, however, there is a somewhat less positive view. If a sense of purpose and meaning in life is taken as a key indicator of spiritual health, then a little less than two thirds of young people pass this test (65%). Life without a sense of purpose can be discouraging and debilitating. Confidence in self and in self-direction is not as high as it may seem. Only 38% of the young people denied that they are often longing for someone to turn to for advice. The darker side of the spiritual health of young people is illustrated by two key facts: 30% of these students often felt depressed and 18% sometimes considered taking their own life.

The communal domain is concerned with what young people believe about those with whom they share their lives and with what young people feel about those relationships. The statistics in Table 1 present a mixed picture. To begin with, bonds with parents are not particularly good.

Nearly half of the young people are not clear that they find it helpful to talk about their problems with their mother (45%), and 61% are not clear that they find it helpful to talk about their problems with their father. Two out of every five young people are worried about how they get on with other people (39%) or about their attractiveness to the opposite sex (45%). Such statistics reveal a lack of confidence in forming and sustaining relationships. Although 85% of young people reported that they like the people with whom they go to school, something darker may lurk below the surface of these reports. The fear of being bullied at school casts a shadow over the life of one young person in every five (20%). Around two thirds of the young people reported that they have close friends with whom they find it helpful to talk about their problems (65%), which is good news, but this also means that 36% could not affirm that this is the case within their own experience.

The environmental domain is concerned with what young people believe about their connectedness to and interdependence with the natural, physical, and human global environment, and with what they feel about that domain. The statistics in Table 1 suggest that young people attending schools without a religious character are far from secure in this domain. On one hand, 50% of the students register concern about the risk of pollution to the environment and 62% register concern about the poverty of the developing world. On the other hand, this means that 50% of the young people were not really concerned about environmental pollution and 38% were not concerned about the poverty of the developing world. For many young people, global peace remains illusory, with 40% displaying concern about the risk of nuclear war. Closer to home, racist attitudes appear to undermine peaceful coexistence within the fabric of a multicultural and multiethnic society. Approximately half the young people feel that there are too many foreign people living in this country (51%) and that immigration into Britain should be restricted (48%). Hope for the future is shown by the fact that 66% of the young people would like to make a difference in the world. One in five young people, however, feel completely disempowered and said that there is nothing they can do to help solve the world's problems (20%).

The transcendental domain is concerned with what young people believe about those aspects of life that transcend the ordinary everyday account of the physical environment, and what young people feel about that domain. The statistics in Table 1 indicate that when spiritual health in the transcendental domain is conceived in traditional theistic terms, fewer than one in four young people believe in God (22%), although the proportion rises to one in three who believe in life after death (36%). Hostility or indifference to organised religion is reflected in the small proportion of young people who reject the accusation that church seems irrelevant to life today (28%). The low level of confidence in traditional religious practices is reflected in the small proportion of young people who feel that prayer helps them a lot (12%). Moving away to alternative spiritual beliefs, more young people believe in their horoscope (28%) than believe in God (22%). At the same time 23% believe that it is possible to contact the spirits of the dead and 13% believe that fortune-tellers can tell the future.

Anglican Schools

Table 2 sets out the profile of pupils attending Anglican schools within the state-maintained sector alongside the profile of pupils attending schools without a religious character within the state-maintained sector. Due to the number of variables being tested, the probability level has

TABLE 2
Anglican Schools

	Nondenominational %	Anglican %	χ^2	$p <$
Personal domain				
I feel my life has a sense of purpose	65	64	0.3	ns
I find life really worth living	71	72	0.4	ns
I feel I am not much worth as a person	16	18	2.1	ns
I often feel depressed	30	30	0.0	ns
I have sometimes considered taking my own life	18	19	3.0	ns
I often long for someone to turn to for advice	33	33	0.0	ns
I am happy in my school	71	71	0.2	ns
Communal domain				
I am worried about my attractiveness to the opposite sex	45	43	3.7	ns
I am worried about how I get on with other people	39	41	3.4	ns
I find it helpful to talk about my problems with my mum	55	53	4.1	ns
I find it helpful to talk about my problems with my dad	39	37	1.5	ns
I find it helpful to talk about my problems with close friends	65	63	1.9	ns
I am worried about being bullied at school	20	20	0.2	ns
I like the people I go to school with	85	84	2.1	ns
Environmental domain				
I think immigration in Britain should be restricted	48	51	5.8	ns
I am concerned about the risk of pollution to the environment	50	51	0.8	ns
I am concerned about the poverty of the developing world (e.g., Africa)	62	64	3.5	ns
I am concerned about the risk of nuclear war	40	42	3.8	ns
There is nothing I can do to help solve the world's problems	20	20	0.1	ns
I would like to make a difference in the world	66	68	1.3	ns
There are too many foreign people in this country	51	57	23.0	.001
Transcendental domain				
I believe in God	22	35	150.9	.001
I believe in life after death	36	40	13.0	.001
The church seems irrelevant to life today	32	30	2.1	ns
I believe in my horoscope	28	28	0.0	ns
I believe fortune-tellers can tell the future	13	14	1.2	ns
I believe it is possible to contact the spirits of the dead	23	25	4.0	ns
Prayer helps me a lot	12	19	67.1	.001

been set at .01. The major conclusion to be drawn from this table is that there are no significant differences between the levels of spiritual health displayed by these two groups of pupils in terms of the personal domain and the communal domain. In terms of the environmental domain pupils attending Anglican schools were more likely to take the view that there are too many foreign people in this country (57% compared with 51%). In terms of the transcendental domain, there are higher levels of belief in God (35% compared with 22%), higher levels of belief in life after death (40% compared with 36%), and higher agreement that prayer is personally helpful (19% compared with 12%) in the Anglican schools, but in all other respects the two groups are indistinguishable.

TABLE 3
New Independent Christian Schools

	Nondenominational %	Christian %	χ^2	$p <$
Personal domain				
I feel my life has a sense of purpose	65	82	57.7	.001
I find life really worth living	71	75	3.0	<i>ns</i>
I feel I am not much worth as a person	16	15	1.1	<i>ns</i>
I often feel depressed	30	26	4.2	<i>ns</i>
I have sometimes considered taking my own life	18	18	0.1	<i>ns</i>
I often long for someone to turn to for advice	33	42	16.6	.001
I am happy in my school	71	77	6.8	.01
Communal domain				
I am worried about my attractiveness to the opposite sex	45	46	0.2	<i>ns</i>
I am worried about how I get on with other people	39	45	5.2	<i>ns</i>
I find it helpful to talk about my problems with my mum	55	54	0.3	<i>ns</i>
I find it helpful to talk about my problems with my dad	39	44	4.0	<i>ns</i>
I find it helpful to talk about my problems with close friends	65	70	6.2	.01
I am worried about being bullied at school	20	13	12.3	.001
I like the people I go to school with	85	89	6.6	.01
Environmental domain				
I think immigration in Britain should be restricted	48	43	4.6	.05
I am concerned about the risk of pollution to the environment	50	56	6.5	.01
I am concerned about the poverty of the developing world (e.g., Africa)	62	82	75.4	.001
I am concerned about the risk of nuclear war	40	41	0.1	<i>ns</i>
There is nothing I can do to help solve the world's problems	20	13	12.1	.001
I would like to make a difference in the world	66	84	59.3	.001
There are too many foreign people in this country	51	38	32.2	.001
Transcendental domain				
I believe in God	22	87	881.0	.001
I believe in life after death	36	75	279.7	.001
The church seems irrelevant to life today	32	9	105.1	.001
I believe in my horoscope	28	6	105.9	.001
I believe fortune-tellers can tell the future	13	7	12.5	.001
I believe it is possible to contact the spirits of the dead	23	18	4.5	<i>ns</i>
Prayer helps me a lot	12	71	1029.6	.001

Christian Schools

Table 3 sets out the profile of pupils attending independent Christian schools alongside the profile of pupils attending schools without a religious character within the state-maintained sector. The probability level has been set at .01. The major conclusion to be drawn from this table is that the ethos of the new independent Christian schools is considerably more distinctive than the ethos of the Anglican schools. First, pupils in Christian schools display a better level of spiritual health in the personal domain. Pupils in Christian schools display a higher sense of purpose in life (82% compared with 65%) and a higher level of happiness in their school (77% compared with 71%). On the other hand, pupils in Christian schools are more likely to long for someone to turn to

for advice (42% compared with 33%). Second, pupils in Christian schools display a better level of spiritual health in the communal domain. Pupils in Christian schools are more likely to find it helpful to talk about their problems with close friends (70% compared with 65%) and are more likely to like the people they go to school with (89% compared with 85%). At the same time, they are less likely to be worried about being bullied at school (13% compared with 20%). Third, pupils in Christian schools display a better level of spiritual health in the environmental domain. Pupils in Christian schools are more likely to show concern about the risk of pollution to the environment (56% compared with 50%) and more likely to show concern about the poverty of the developing world (82% compared with 62%). Pupils in Christian schools are less likely to take the view that there are too many foreign people in this country (38% compared with 51%). Pupils in Christian schools are more likely to want to make a difference in the world (84% compared with 66%) and less likely to feel that there is nothing that they can do to help solve the world's problems (13% compared with 20%). Fourth, in terms of the transcendental domain, pupils in Christian schools display a much higher level of commitment to traditional religiosity: 87% believe in God (compared with 22%), 75% believe in life after death (compared with 36%), and 71% believe that prayer helps them a lot (compared with 12%). Only 9% of pupils in Christian schools maintain that the church seems irrelevant for life today (compared with 32%). At the same time, pupils in Christian schools are much less likely to support alternative spiritual beliefs. Only 6% of pupils in Christian schools believe in their horoscope (compared with 28%). Only 7% of pupils in Christian schools believe that fortune-tellers can tell the future (compared with 13%).

CONCLUSION

This article has employed John Fisher's model of spiritual health to explore differences in the overall ethos (as reflected by the body of pupils) of three different types of schools in England and Wales. Taking spiritual health as a measure of school ethos, and taking schools without a religious character within the state-maintained system as the benchmark, attention has been focused on two distinctive types of schools with a religious character: Anglican schools within the state-maintained sector and new independent Christian schools. Three main conclusions emerge from this study.

The first conclusion concerns the utility of Fisher's model and what this model has to say about the spiritual health of young people within the benchmark category of schools without a religious character within the state-maintained sector toward the end of the first decade of the 21st century. The model has offered a rich characterisation of this group of young people. In terms of the personal domain, the data celebrate the discovery that the majority of young people (71%) find life worth living but also draw attention to the fact that 35% have no sense of purpose in life and to the fact that 18% sometimes consider taking their own life. In terms of the communal domain, the data celebrate the discovery that the majority of young people (85%) like the people with whom they go to school but also draw attention to the fact that 20% live in fear of being bullied at school. In terms of the environmental domain, the data celebrate the discovery that the majority of young people would like to make a difference to the world but also draw attention to the fact that 20% felt that there is nothing that they can do to help solve the world's problems. In terms of the transcendental domain, the data demonstrate that alternative spiritualities may

now be gaining greater support than conventional religion: 28% of young people believe in their horoscope, compared with 22% who believe in God.

The second conclusion concerns the ethos of Anglican schools within the state-maintained sector. The spiritual health of young people within these schools is indistinguishable from that of young people within schools without a religious character within the state-maintained sector apart from two markers within the transcendental domain. Young people in Anglican schools are more likely to believe in God (35% compared with 22%) and more likely to believe in life after death (40% compared with 36%). On one hand, this finding may allay fear that the Anglican Church could be abusing its privileged position within the state-maintained sector of education to influence young people differently from schools without a religious character within the same sector. On the other hand, this finding may lead to some puzzlement regarding the Anglican Church's commitment to a nondistinctive presence within education.

The third conclusion concerns the ethos of the new independent Christian schools. The spiritual health of young people within these schools is distinctive across all four domains. Within the personal domain, pupils within Christian schools enjoy a higher sense of purpose in life (82% compared with 65%). Within the communal domain, pupils within Christian schools gain more support from close friends by talking about their problems (89% compared with 85%) and are less likely to be worried about being bullied at school (13% compared with 20%). Within the environmental domain, pupils within Christian schools are more committed to making a difference to the world (84% compared with 66%). Within the transcendental domain, pupils within Christian schools are much more inclined to believe in God (87% compared with 22%) and less inclined to believe in horoscopes (6% compared with 28%). These findings appear to be consistent with the aims of the new independent Christian schools, which seek to create a radical alternative educational environment different from that found in schools without a religious character within the state-maintained sector.

The present study is, however, limited by the relatively small number of schools participating. By restricting the sample to just two year-groups within these schools (Year 9 and Year 10) and by not including a wider range of schools, especially Roman Catholic schools, the study may limit the breadth of its applicability. These limitations are, however, being addressed by the authors' ongoing research program

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Finding a Golden Mean in Education Policy: Centering Religious and Public Schools

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The separation between Church and State, private and public education, is blurring, and coming together, as the government gives families vouchers to attend private and religious schools. Religious groups are starting and supporting their own charter schools, and local jurisdictions (cities and counties) are providing free transportation and food services to children attending private schools. What emerges, and is the focus of this analysis, is the new “middle ground,” a “golden mean,” by which public schools learn diversity and choice while private/religious schools are helped by public programs and funds. The oldest, perhaps, was Lyndon Johnson’s compromise with the Catholics to get Title 1 passed as part of the Elementary and Secondary Education Act that sends public school teachers into private schools to help children in need. This study examines the emergence of a middle group in public–private education, and how the policies are working and what’s changing. It argues that the child is the center of education, and government and private agencies are changing and should come together to serve the clients, the children.

INTRODUCTION

The “great divide” in U.S. education since the 1920s has been between government-supported public schools and independently financed private and religious schools. Attempts to use tax-dollars to pay for private religious education have often landed in the courts, which have determined until quite recently that public dollars cannot support religious K-12 education. Grounding decisions in the First Amendment of the U.S. Constitution—that the government can neither “establish” nor “prohibit” religion—the courts have consistently ruled against prayer, teaching religion, theology, and Bible reading in *public* schools. They have also come out against public funding and support for *private/religious* schools.

Initially starting as a major divide between the Roman Catholic parochial “private” schools—which educate about 12% of the students in the United States and the predominantly Protestant “public” schools (Cattaro & Cooper, 2008; Cooper, 1996)—the separation quickly became generalized to encompass the public versus private funding that distinguishes the system of U.S. education from other modern nations, many of which heavily subsidize all schools, be they public, private, or religious. In England, for example, the public and church sectors mutually support each other:

The English education system developed in partnership with the mainstream Christian churches, whose involvement in education pre-dates that of the state and which focused on providing education for the poor. Since 1944 faith communities have been able to apply to set up schools in the state sector in response to demand from parents. Today around a third of maintained [public] schools have a religious character and are popularly known as faith schools. (Cooper, 1996, p. 44)

Differences exist in the United States, however, as attempts to use tax dollars to pay for private-religious education have usually landed in court. Demarking Church, State, and education, we now see the “sides” working more collaboratively with each other, as public agencies (local schools, state and federal governments) have begun to support private religious schools. For example, public resources are now allocated under No Child Left Behind (NCLB) Title 1 to needy children in religious schools. NCLB also allows for funds directed toward religiously related charter schools, and vouchers are now given to families who may legally “cash them in” at a religious private school (see *Zelman v. Simmons-Harris*, 2002).

Agencies of religious groups—including churches, mosques, synagogues, and their associations—are currently accepting and using public funds to help pay for the rising costs of religious schools. Under federal, state, and some local programs—such as Title 1 (NCLB) to help children of poverty, those with special needs (PL 94-142 and Section 504 of the Rehabilitation Act), and all children under nonpublic school tax relief have regular access to free public transportation, food services, and so on.

Philosophers and policymakers have often seen education as both a critical *personal* life choice and responsibility and a common, *civic*, public community concern, citing its ability to build the economy and enhance the social order and serve the national “good” (see Schultz, 1960). Thus, bringing together the individual’s growth and well-being with the development, safety, and health of the nation (if not the world) has been a challenge for humanity almost forever.

Compounding this inherent challenge is the economic reality following the financial market crash and global recession of the past few years. Depleted federal and state coffers throughout the United States may be motivating the educational marketplace to use scarce resources more wisely. This effort often includes increasing productivity within school districts and states and creating efficiencies so as to leverage any available sources of public and private funding.

With the controversial power of teachers unions in public school systems, the sheer size and inefficiency of the monopolistic educational bureaucracies at virtually all levels of government are often making schools less effective. Furthermore, the rising challenge of educating a diverse population to meet the demands of an increasingly competitive global economy means that American taxpayers and voters want more and better educational choices—and the introduction of competition into the educational marketplace.

Some scholars—notably Milton Friedman (1955, 2002)—have asserted that the introduction of choice and competition can and does create improvement in the larger system, in this case in the public education system. Research by Gerard, Fitz, and Taylor (2001), Hoxby (1996), Tiebout (1956), and Armor and Peiser (1998) also supports this proposition.

On the other hand, Dianne Ravitch (2010), in her book, *The Death and Life of the Great American School System*, declares that “choice is undermining education” and dedicates a chapter to discussing how the introduction of vouchers and charter schools is weakening public education in our country. Ravitch has gained considerable notoriety for her stance on charter schools, even

though she admittedly has flip-flopped on this issue. Earlier in her career, Ravitch had been a supporter of school choice, including charter schools.

We find several of Ravitch's claims about charter schools to represent oversimplified generalizations in her book. In a contradiction to Ravitch, we see that public education is becoming more privatized through increased avenues of choice such as charter schools, which in essence operate within the public sphere. In addition, private schools are getting more public help through vouchers, Title 1 funding, special education, tax credits, and other state programs to help them deal with rising costs.

Thus, this article discusses the new "middle ground," a kind of *golden mean*, as public school leaders learn and benefit from private schools while private schools get help from increasing public programs and resources. Private religious schools are growing and working more closely "together" with public schools and government in a collective societal role in six main ways:

1. Receiving public funds for special categories of students who attend private and religious schools, including those classified as poor (NCLB, Title II-A), special education (PL-94-142 and Section 504 of the Rehabilitation Act), or English language learners.
2. Using public services and resources provided to private school students locally, such as free transportation, food services, medical help, and recreation.
3. Offering tax-free statuses to private and religious schools as nonprofit education institutions and tax breaks in some states for private school tuition.
4. Accepting public vouchers, which, under the Supreme Court ruling in *Zelman v. Simmons-Harris* in 2002, allow children to attend private religious schools of choice, with public funding. Because vouchers go to families, and not religious schools directly, parents can freely choose to send their students to private religious schools at little cost to them.
5. Opening dozens of new religiously related (public) charter schools (see Mulvey, Cooper, & Maloney, 2010), funded by state and local governments. These charter school programs operate with private and religious support, affiliations, leadership, and programs—although major costs are covered under state charter funding.
6. Sharing governance strategies and trustees historically connected to independent schools and other 501 (c) (3) nonprofit organizations. In virtually all states, independent board of trustees, much like those in America's private schools, manage these public charter schools. In New York City, for example, several boards of trustees of public charter schools are populated with private school parents and trustees who are able to transfer governance techniques and tactics from the private to the public sector (see Weinberg, 2007).

UNDERSTANDING THE NEW MIDDLE GROUND

This article, thus, argues that a new *middle ground* in American pre-K-12 education is emerging, which (a) brings together the qualities of private/religious life with universal, tax-supported "public" education; (b) often creates more diverse, responsive, active, and successful new schools; and (c) partially breaks the monopoly of the large public education system, leading to more responsive and competitive types of education. Both public and private schools, it appears, are increasingly working together to improve and enhance their institutional capacity—for the benefit of all children—even though this process is highly controversial and dynamic.

As Koedel, Betts, Rice, and Zan (2010) explained,

Since the 1960s, policymakers have used targeted school choice policies to increase integration in public schools. For example, magnet schools—by providing specific programs, following a type of pedagogy, or specializing in a subject area—may attract white students to non-white schools. Also, explicit school choice policies for marginalized groups may allow some families the opportunity to select a school outside their local community. However, these policies typically affect only a small fraction of all students, raising the risk that they may be counteracted by other policies that are statewide or large scale. (pp. 22–23)

What are the advantages, and disadvantages, then, of the new movement in public–private religious education, as the lines between “church,” “state,” and “schooling” become more blurry in the United States? How might this new middle ground assist the declining Catholic schools, and enhance the diversity of private schools, while improving overregulated public schools? We see the growth of new quasi-public schools as a response to these questions in today’s changing society.

With children learning more and more online, at home, and on their own, schools of all types must become smaller, more engaging, and more client driven. Charter schools, vouchers, and independent religious schools represent the beginnings of this process. Public schools, too, have begun to adapt and shrink, often breaking up into smaller, more self-governing units. In this way, the publics and privates are moving to the “middle” of the educational perspective.

But to engage with these changes, we must first define and understand what the “New Middle Ground” of public–private schools looks like: that is, the advantages and disadvantages of the new common schools, and how they compare to the organization and funding of schools in other countries. We contend that quality schools, whether they are public or private or a hybrid (Eisele-Dyrli, 2011), can serve the public good. Education can be a highly personal, private, and spiritual experience and at the same time serve everyone’s concerns by (a) developing and benefiting all children; (b) growing the national economy; and (c) increasing civic pride, social responsibility, and democratic participation.

Catholic Schools “Go Public”

As Catholic parish schools have closed, local Catholic Church leaders such as Donald Cardinal Wuerl in the Archdiocese of Washington, DC, have converted these failing schools into publicly supported charter schools. The agreement by the Archdiocese permits schools to remain open for their communities and parishes that fulfill the mission of the Catholic Church. At the same time, this arrangement offers new urban charter schools ready-made and badly needed school facilities. Because charter schools in many American cities receive no facilities funding and struggle to find quality school spaces to lease or own, this collaboration between the Catholic Church and charter school is pioneering new ground. As the *Washington Post* reported in 2008:

The D.C. Public Charter School Board approved a controversial proposal last night to allow seven financially struggling Catholic schools to reopen as secular charters this fall, although the city’s plan for funding the schools remains uncertain. The schools, with a total projected enrollment estimated at 600 to 1,000 students, are Assumption and Holy Comforter-St. Cyprian in Southeast; Holy Name

and St. Francis de Sales in Northeast; and Immaculate Conception, Nativity Catholic Academy and St. Gabriel's School in Northwest (Turque, 2008).

MOVING TOWARD A "GOLDEN MEAN"

Step 1: Aid to Catholic and Other Private School Children

The first official federal action—in the form of legislation—for publicly aiding private religious schools came in 1965. President Lyndon B. Johnson, who took over as president with the assassination of president John F. Kennedy in 1963, had a strong liberal Democratic majority in Congress and proposed the first major federal aid program for impoverished children, called the Elementary and Secondary Education Act (ESEA). To build a strong liberal coalition, President Johnson approached the Catholic Church hierarchy for support for the ESEA bill. One aspect of President Johnson's alliance with the Catholic Church was to promise them access to federally supported Title 1 services for low-income children in their parish schools.

As Leekley (2010) explained, "Monsignor Frederick F. Hochwalt, the Director of Education of the National Catholic Welfare Council (NCWC), spearheaded the effort to get federal aid for nonpublic schools. His campaign resulted in Catholic support for the passage of ESEA 1965, the first general aid bill which included appropriations for nonpublic schools" (p. 1).

However, ESEA legislation did not result in direct federal financial aid to Catholic schools but rather in federally supported services. Specifically, local public school teachers, and other specialists, are going into Catholic schools to provide Title 1 services, for example, tutoring, extra help in basic subjects, and other assistance specifically to support low-income children in these parochial schools.

Was federal aid of this nature to local private religious schools legal? When the public schools sent supervisors into the religious schools, to ensure that Title 1 instructors were not teaching religion, these inspectors were deemed as "intruding" into the life of the parochial schools, thus violating the First Amendment. Later, in *Aguilar v. Felton* (1985), the U.S. Supreme Court considered whether New York City's decision to use Title 1 funds to pay the salaries of Title 1 schoolteachers violated the Establishment Clause of the First Amendment. The court eventually decided that, even though the efforts of the City of New York were well intentioned, the funding practices violated the Constitution.

Hence, according to the *Aguilar* (1985) decision, "involving agents of the city in extensive monitoring in religious schools increased the potential for 'divisiveness along religious lines' and violated the intent of the Establishment Clause, which is to prevent the intrusion of Church and State into each other's respective domains." Twelve years later, however, *Agostini v. Felton* (1997) reversed the earlier *Aguilar* (1985) decision, stating that it was permissible for public schools to send their supervisors into Catholic and other religious schools to inspect Title 1 classrooms without violating the "separation" tenet.

As the decision stated, in determining whether Title 1 violated the First Amendment of the Constitution, the Court found, "No. The Court overruled its decision in *Aguilar v. Felton*—that no evidence supported its former presumption that the entrance of public school teachers into parochial schools will inevitably lead to the indoctrination of state-sponsored religion" (*Aguilar v. Felton*, 1985).

Step 2: Public Services for Private Religious Schools

Other examples show how public services reach and serve private and religious school children. One such example is quite simple—when students ride to school on school buses or subways, they do so at public expense. Similarly, “free and reduced lunch programs,” based on the poverty level of the family, are available to children in religious schools as well as in public and charter schools (National Alliance for Public Charter Schools, n.d.).

As the government describes it, school districts and independent private schools that choose to take part in the free lunch program get cash minimal subsidies and donated commodities from the U.S. Department of Agriculture for each meal they serve. In return, they must provide free lunches that meet federal requirements, thus offering free or reduced-price lunches to eligible children. The government will also reimburse school food authorities for snacks served to private school children through age 18 in after-school educational or enrichment programs.

Thus, a social mission—to feed, safely transport, take care of, and educate all children—provides an available common ground that spans the private/public divide, and means that the government does assume responsibility for all children, be they private or public school students.

Step 3: Passing Voucher Laws

Perhaps the most dramatic step toward creating a new shared center between public and private education occurred with the legislating of public voucher programs. This legislation provided families with the resources to select and enroll their children in a range of private and religious schools. States are now regularly passing voucher programs, tax credits, and charter school laws that in some cases work to “privatize” public education while making private and religious schools more “public.”

The voucher and charter school policies have helped religious groups to open schools with Muslim, Jewish, Catholic, or Protestant identities. The U.S. Supreme Court ruled that school voucher programs are constitutional in *Zelman v. Simmons-Harris* (2002). The decision stated that giving public funds (e.g., vouchers) to parents, who may choose religious schools if they wish, is not the same as the government directly subsidizing religious education. The judges wrote,

Our jurisprudence with respect to true private choice programs has remained consistent and unbroken. Three times we have confronted Establishment Clause challenges to neutral government programs that provide aid directly to a broad class of individuals, who, in turn, direct the aid to religious schools or institutions of their own choosing. Three times we have rejected such challenges. (*Zelman v. Simmons-Harris*, 2002)

Thus, the *Zelman* decision determined that participating private schools must agree not to discriminate on the basis of race, religion, or ethnic background, or to “advocate or foster unlawful behavior or teach hatred of any person or group on the basis of race, ethnicity, national origin, or religion.”

Step 4: Religious Charters

Lately, many state lawmakers have raised a new practical, legal question: Should religious groups be given full state funding for charter schools that embody their beliefs and values? Already Florida has four predominantly Jewish charter schools affiliated with the Ben Gamla organization, and Donald Cardinal Wuerl has converted seven failing Catholic parish schools into charter schools in Washington, DC. Similarly, a Greek Orthodox community in Brooklyn, New York, formed the Hellenic Classical Charter School on the site of a former Greek Orthodox school. In addition, in Chicago the Christian Brothers helped to open two charter schools in impoverished neighborhoods on Chicago's west side.

This trend is important in American education, as the Catholic Church continues to close traditional parish schools for lack of support and funding and then converts these schools into local charter schools or leases the school facilities to charter schools. Thus, collapse of Catholic schools, as Meyer (2011) explained, has

made a *Catholic-operated public schools* seem increasingly possible: (1) the traditional parish-based Catholic schools system, especially in the inner cities, were crumbling; (2) equally troubling, urban public-school systems were failing to educate most of their students; and (3) a burgeoning charter school movement, born in the early 1990s, was beginning to turn heads among educators in both the private and public sectors. (p. 41)

These charter schools, furthermore, often teach the language of their sponsoring religious groups (e.g., modern Hebrew, Greek, Arabic). State and federal legislators must now ask themselves whether children and society benefit from the mingling of public support and dollars with private and religious values, languages, and practices. Charter schools under religious banners may be a key answer to this question, as they perhaps present the best of both worlds. Public support can mean more help for all children, regardless of the income of their families and schools, based on individual need and public goals.

Private religious education can build strong values, answer human concerns, and foster spiritual development. For Chubb and Moe (1990) found that the bureaucracy inherent in the Catholic Church is *not* as stifling or negative to student performance as regulations and controls often found in the traditional public school sector.

As in Chicago, the question of church-state "separation" or "cooperation" still raises interesting questions for American education. The principal of the Catalyst charter schools in San Miguel, Chaun Johnson, stated, "We will live the values and virtues of the Christian Brothers without speaking the words," bringing a "Catholic ethos, not the catechism to children . . . and educating them in reading, writing, and 'rithemic' . . . taking "faith-based" and making it "values-based" (as cited in Meyer, 2011, p. 48).

Step 5: Charter Academies Serving Religious Schools

Another means for balancing public support with private religious schooling that could be revolutionary in American education is the possible formation of a "Charter Academy without Walls." Such an academy is a state-supported charter school that offers secular subjects (e.g., English,

mathematics, science, modern languages, and social studies) to children attending private religious schools. With such “charter academies,” private religious schools would be relieved of the expenses of hiring secular-subjects teachers, allowing them to instead concentrate on teaching the religious subjects (as in a Jewish school, the subjects would include Hebrew, Torah, and Talmud).

This Charter Academy would be a perfect balance, representing a true “golden mean,” as the state pays for the child’s secular subjects, while the parents are charged for the “private” part—the religious subjects and practices. Such a compromise would create an ideal combination of “church” and “state.” Several issues are raised by such a private–public school, if one were to be created: First, would the state chartering agency grant a charter to a school that has no walls, no students, and no graduates but that offers a range of required secular subject classes in English, mathematics, social studies, and science? Not yet, but perhaps.

Second, would the state chartering agency permit these classes to be taught by state-certified teachers offering these classes in religious schools? Third, would the religious schools be comfortable having teachers from another school, that is, the charter academy, teaching their children? What would the religious school do if a secular teacher made a comment in class that upset the religious community in the schools?

Fourth, as teachers would be teaching students in nearby religious schools, how would the charter academy be evaluated without students of its own? Would statistics such as students’ attendance and retention rates, test scores in the state-mandated core curricular subjects, and other indicators provide ample data for charter school evaluations—even for charter schools that were offering these courses in a religious school?

Fifth, would the religious schools have the right to evaluate the secular charter schoolteachers, and remove them if they were not performing well for their children? Or could the boards of trustees of the charter academy hire an administrative leader by contract—perhaps a certified public school principal—who would be held responsible for student outcomes and teacher performance, like the boards of trustees of some independent schools today? We think these questions can be answered, and the “Charter Academy without Walls” could be an efficient, useful way to support and help children attending private religious schools in the United States.

One concern is whether the notion of the Charter Academy is so legally controversial and outside of the box that it would be dismissed by policymakers. We think not, in part because of the proliferation of a variety of technologically savvy programs like the School of One and iZone in New York City.

Discussing School of One, an article in *Education Week* stated that the program could be “a more effective way of structuring school time . . . as the School of One is on to something that could change the very definition of a teacher, a student, and administrator, or a content provider” (Quillan, 2011b, p. 18).

When discussing New York’s educational iZone project, Quillan (2011a) reported that “for AP classes, [iZone] means easing the funding burden by having teachers instruct 35 students from the high-tech *ischool* in Manhattan via videoconferencing Skype” (p. 17). Investing in Innovation—better known by the shorthand “i3”—is funded by Cisco and Microsoft. Programs such as i3 receive millions of dollars from federal competitive-grant competitions and have the potential to move us toward a golden mean and, at the same time, produce more effective, personalized instruction.

Another creative option for students and parents is the possibility of a “virtual charter school” with religious association, which would represent the online counterpart to a more traditional

charter school. Like bricks-and-mortar schools, virtual charter schools would vary from state to state, but they would all provide courses online and give students unable to attend the physical school access to lessons delivered by licensed teachers. (Note that although virtual charter schools and virtual public schools often offer similar programs, they are also distinct from one another in ownership and management.) As of 2010, 219 virtual charter schools have opened in 25 states—and this subsector is growing. The District Administration website in January 2011 announced that

the Eli and Edythe Broad Foundation awarded \$1 million to Rocketship Education, a small nonprofit elementary charter school operator based in San Jose, California. The funding, in addition to \$6 million recently awarded by the nonprofit venture capital firm Charter School Growth Fund, will help Rocketship expand from the three San Jose “hybrid” charter schools it now operates (with two more slated for fall 2011) to 30 nationwide by 2015. Rocketship’s hybrid model combines instruction from certified classroom teachers with instruction from Web-based software in a learning lab each day, as well as one-on-one tutoring. The software emphasizes basic skills, allowing teachers to focus on critical and higher-order thinking skills.

If these services are already being delivered in 25 states via a hybrid combination of computers and certified teachers, why not consider applying these practices to the Charter Academy concept, thereby allowing private and religious schools to receive secular instruction in subjects such as math, English, science, and social studies at public expense?

Thus, this idea of a Charter Academy without Walls would be a good case of bringing public and private schooling together to serve children in a cost-effective way. The program would preserve the identity and mission of private/religious schools while also giving their students public support in required secular subjects such as English, sciences, social studies, and mathematics.

Chicago’s Terry Toth reported that “exploring opportunities to add more schools” has gained increased support from the religious community, as when “The Circle Rock campus [of the Catalyst Schools] got more traction because of the Rock of Our Salvation Baptist Church and there was community support” (as cited in Meyer, 2011, p. 48). Thus, the Christian Brothers opened a Catalyst charter school with help from a Baptist church’s “supportive community.” What could be more communal, interdenominational, and public–private than that?

A NEW GOLDEN MEAN EMERGES

We see, then, that the lines separating private and public, nonsectarian and religious K-12 education are blurring. This blurring effect presents both a challenge and an opportunity for legislators and policymakers, as well as educators and parents.

Blurring the Lines

We can argue for cultivating a new “middle ground” in education. *Blurring the Lines* (2010), a book coauthored by Janet Mulvey, Bruce S. Cooper, and Arthur Maloney, describes an emerging “golden mean” in which it may be possible—if done properly—for state and federal funds to support schools founded on private and religious beliefs.

Decades of Precedents

This convergence is not really new. Thus, in summary, we can cite major changes in federal policy under President Johnson, who turned to Catholics to help pass the ESEA of 1965. In 2002, ESEA evolved into NCLB, which currently allots public school teachers and resources to religious schools as a way of helping children in poverty under the provision of Title 1. In addition to ESEA, and its follow-up NCLB, Congress also passed the Rehabilitation Act of 1973, which gives significant funding to children attending private schools who have been classified with special needs or disabilities.

In fact, precedence extends much further back, to the “legalization” of private and religious schools in 1925. In a landmark U.S. Supreme Court case originating in Oregon, the courts overturned a policy enacted by then-governor Walter Pierce, which had made public education compulsory through a successful state constitutional amendment, essentially outlawing the ability of Oregon’s school-age children to enroll in private and religious schools.

The Catholic Society of Sisters of the Holy Names of Jesus and Mary joined with the Hill Military Academy, a secular private school in Portland, to sue the state of Oregon. They won in the landmark court decision, *Pierce v. Society of Sisters of the Holy Names of Jesus and Mary*, 268 U.S. 510 (1925)—thereby establishing a modern Magna Carta for legalizing private and religious education in the United States that remains in force to this day.

Similarly, the U.S. Supreme Court’s landmark ruling, *Zelman v. Simmons-Harris* (2002), affirmed the legality of giving public, tax-based vouchers to families who could “cash in” their publicly funded vouchers at private or religious schools of their choice without violating the “separation of church and state.” The *Zelman* case of 2002, which originated in Cleveland, Ohio, thus reflects the spirit and letter of the *Pierce* decision from 1925 with these purposes:

Ohio’s Pilot Project Scholarship Program provides tuition aid in the form of vouchers for certain students in the Cleveland City School District to attend participating public, or private, schools of their parent’s choosing. Both religious and nonreligious schools in the district may participate. Tuition aid is distributed to parents according to financial need, and where the aid is spent depends solely upon where parents choose to enroll their children. In the 1999–2000 school year 82 percent of the participating private schools had a religious affiliation and 96 percent of the students participating in the scholarship program were enrolled in religiously affiliated schools. (PocketJustice, OYEZ, U.S. Supreme Court media; <http://www.pocketjustice.com/>)

We now see how history, legal precedence, and public policy can support a truly public education system in which American children are able to learn ethical values, skills, personal responsibility, and civic duty, alongside their secular subjects. Also, private and religious schools can add beliefs, hopes, and meaningful community concern, which together offer societal coherence, teach life skills, and reinforce common values (Cooper, Marcus, & Weinberg, 1999).

Toward a “Golden Mean”

In an era of NCLB and, now, Race to the Top, and with the emergence of Common Core State Standards, state legislators are called upon to help ensure quality and more equitable support for pre-K, elementary, and secondary schools. These efforts may likely lead lawmakers to craft

policies encouraging innovation, opening more charter schools and awarding vouchers for families to use to select the school of their choice (public, private, or religious), and equitable state funding for all.

The “golden mean” comes to mind, as traditionally public and private (and religious) school are being changed and directed more and more by state and federal policies. Cooper (2010) argued that

lawmakers should not view private or religious schooling as competitors but instead as complementary to the traditional public responsibility in education—moving toward a new balance, a “golden mean.” Healthy competition can make for better schools and a stronger society. Skills matter, but so do values. (p. 43)

Indeed in a postrecessionary global economy, where financial resources are still constrained and local communities continue to struggle with cutbacks and reduced budgets, we ought to find ways to collaborate, maximize every possible resource, and leverage distinctive strengths—whether public, private, or religious—for the common good.

NEXT STEPS

A “golden mean” should move toward the best of both worlds, not creating two conflicting and competing public–private educational worlds, as has been the case during recent decades. Toward these ends, state legislatures and governors, in particular, should enact a range of policies to expand the “golden mean” among public and private religious and nonreligious schools. Some possible options include the following:

1. *In-kind support.* Expand in-kind services to nonpublic and religious schools to give them educational materials such as textbooks, health services, busing, computer technology, and software, as well as special education services. New York State gives such in-kind support in lieu of cash disbursements to religious schools, thereby avoiding constitutional conflicts that bar direct financial support. Such policies allow nonpublic schools to mitigate costs and operate on sounder financial footing, but more should be done. Moreover, education departments could also encourage greater interaction among various school sectors—private, religious, charter, and district sponsors—in various settings. Schools of all types can and do learn from each other about what works and how to maintain and improve staff and learning.
2. *“Dual enrollment” programs.* States could also offer or expand opportunities for private and religious school students to take certain specialized high school coursework not commonly available in nonpublic schools. These publicly supported programs could include occupational and vocational-technical courses, foreign language instruction, and advanced placement courses.

New York, for example, provides “dual enrollment” opportunities for private school students. Although these opportunities are still small, it is our opinion that they should be broadened. Such programs would help more students remain in private schools while increasing school support as taxpayers for public schools, filling a void in specialty areas

(e.g., languages, Advanced Placement courses, even college courses) sometimes lacking in private and religious schools.

3. *Charter schools.* States could significantly expand charter school opportunities by encouraging their creation, especially in areas that lack high-quality public schools and in low-income areas. Ten states currently have no charter school laws at all, and many states that do should strengthen them to encourage more and higher quality charters. States also could follow the examples of Washington, DC, Indiana, Florida, and Texas, where private religious schools, struggling with finances, have been converted into public charter schools while still maintaining a values-based component as part of their curriculum.

Thus, to create more charter schools, opportunities exist to improve the authorizing and oversight practices for charter schools, so as to ensure educational quality and better student outcomes. These public resources might encourage high-quality educators and organizations—including those associated with religious-based groups—to branch out and open new schools.

Financially, struggling private school systems—particularly those operated by many Catholic dioceses and parishes—could lease their underused or empty Catholic school buildings, which would provide a revenue source to shore up the finances of the remaining parish schools. Because many urban school systems are already overcrowded, closing more Catholic schools, and shifting their children into the nearby public schools, may likely overcrowd these public schools further, thus reducing quality in these schools.

4. *Tax credits for private schooling.* States can also use their tax codes to encourage greater school choice options, primarily through the use of individual and corporate tax credits to help finance either private school tuition or public school tuition for students gaining admission to another nearby public school district.

According to the New York Foundation for Education Reform and Accountability, only five states currently offer individual tax credits or deduction opportunities, and seven states provide a tax credit for donations to education scholarship organizations. This latter approach, authorized in Arizona, was upheld by the U.S. Supreme Court in *Arizona Christian School Tuition Organization v. Winn*, decided in April 2011. This ruling means that other states could also legally offer tax credits or deductions for citizens who support scholarships for children attending private religious schools.

5. *Vouchers or “scholarships.”* Only four states and Washington, DC, currently have authorize voucher programs, whereas seven more states provide resources for students with disabilities to transfer to another school system, according to the New York Foundation for Education Reform and Accountability. Targeted scholarship programs could be added that would aid students in low-performing school districts, students in federally designated “persistently lowest achieving” schools, or students from low-income households. Because of their versatility, voucher programs are undergoing more serious debate in several states, including Pennsylvania, Florida, and Indiana—the latter of which recently approved up to 15,000 education vouchers to be phased into practice over 2 years.

The United States has a long and noble tradition of endeavoring to educate every child to the highest possible level, regardless of race, color, ethnicity, spoken language, creed, disability, or geographic location. At the same time, Americans have always been and remain a deeply religious people, with 65% professing a belief in God, the highest level in the modern world.

Enacting policies to expand and strengthen charter and private educational opportunities, including religious schools, would build this golden mean and give benefits both to private *and* public schools. As more children remain in, or are added to, the ranks of private and religious schools, this change imposes only modest marginal educational cost to taxpayers. As more children attend private schools, neighboring public schools also are relieved of the costs of educating more students.

Conversely, with the closing of more than half of U.S. Catholic schools since 1965, these students in most cases must attend local public schools, in overcrowded urban systems. As such, one sector's decline puts greater pressure on the other sector. This potential overcrowding is another good reason to reverse the declining private religious school enrollments and to maintain both sectors—public and private—as they exist for the best interest of children, parents, and their communities.

CONCLUSIONS

We thus need to redefine and understand the New Middle Ground of public-private schools. We should also analyze its advantages and disadvantages. Finding a common center point could mean, in the future, that private and public schools shed light on each other's practices, and help to improve education on both sides of the divide. This "radical center," the "extreme middle," would mean that the best qualities and practices of both types would help make education better overall.

The "publicness" of public schools teaches private schools about public responsibility and earns private schools general support and funding—as with vouchers, charter, and government aid. Meanwhile the private, religious, values-centeredness of private schools can inspire public schools to compete, teach values, appeal to families, and build support. Public and private become two sides of the same coin. They both come to mean a high-quality and responsive education equation, best exemplified by religious charter schools and the vouchers that allow funding to follow student needs and aspirations.

We urge policymakers to study how other nations are addressing these questions and answer the question, How does our increasingly diverse education, including public, private, and religious schools, compare to the organization and funding of schools in other countries, which have long supported public *and* private schools with public funding?

We see evidence that these trends are beginning to occur in the United States despite a steady series of Constitutional/legal challenges. As such, the open question, according to Meyer (2011), was "whether 'a faith-based group of competent educators' could run a publicly-funded school without crossing the church/state line" (p. 43)? It appears they can—and have—as a new golden mean is emerging in U.S. education. Although happening slowly, it's coming nonetheless, and our strained financial resources may make it inevitable in the long term. In fact, on April 23, 2012, public, private, and Catholic schools in Philadelphia signed a "compact" to work closely together for the benefit of all children. As the Council for American Private Education (2012) reported:

At a ceremony on April 23 at St. Peter the Apostle School in Philadelphia, Catholic Archbishop Charles J. Chaput, standing with Mayor Michael A. Nutter, became the latest official to sign the

Philadelphia Great Schools Compact, an alliance aimed at replacing 50,000 slots in poor-performing schools with high-performing alternatives by 2016–17. (p. 1)

Thus, we've done a better job in recent years of letting religious groups exercise their educational rights and responsibilities while holding public schools to a higher standard of learning and human conduct and collaborating for children's benefit. Perhaps as education reform is entering this next phase, the motto should be: "In God we trust!"

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Building New Bridges to America's Schools: Lessons From the University of Notre Dame

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This article tells the story and explores the significance of Notre Dame's efforts over the past 18 years to serve the pressing needs of underresourced elementary and secondary schools throughout the United States, with a special focus on the faith-based sector—and more particularly, Catholic schools. These schools are increasingly fragile but possess a well-documented track record of success educating low-income minority students. The closure in 1976 of Notre Dame's Department of Education left open an institutional space for entrepreneurial initiatives and new partnerships responsive to the needs of schools across the nation. Attentive to the manifold ironies inherent in the founding (in the mid-1990s) and growth of the Alliance for Catholic Education (ACE) program and Notre Dame's Institute for Educational Initiatives in which ACE is housed, the authors discern a pattern in which seeming deficits and obstacles repeatedly spark innovative responses and powerful alliances among a diverse range of stakeholders united by common goals. Drawing upon lessons learned, both through failures and successes, these reflections suggest roles that institutions of higher learning might play to improve the quality of education in faith-based, private, and public schools.

"Full oft 'tis seen,
Our means secure us, and our mere defects
Prove our commodities"—*King Lear*

Why would an R1 research university such as the University of Notre Dame invest considerable time, talent, and treasure into a national effort to sustain, strengthen, and transform Catholic elementary and secondary schools across the United States? Indeed, why would Notre Dame make this investment at a time when Catholic schools continue to close at alarming rates (more than 1,700 since 2000) and enrollments continue to fall (McDonald & Schultz, 2011)? Forty-five years after their peak enrollment of more than 5 million students in more than 12,000 schools, today we see less than half as many students in nearly half as many schools (McDonald & Schultz, 2011). This has occurred even though the population of the United States has almost doubled (U.S. Census Bureau, 2010), and Catholics still comprise nearly one fourth of the nation's population (Pew Forum on Religion & Public Life, 2008). Considering this, the timing and subject of a massive university investment in Catholic P-12 education could hardly seem less auspicious or, perhaps, even downright foolish.

Although it wouldn't be the first time that substantial capital would be unwisely invested in education reform, Notre Dame's investment may in fact prove to be timely and important. After all, for all the closures, Catholic schools still comprise the largest system of private schools in the world (Arthur, 2005). As such, Notre Dame has chosen to make this investment of time, talent, and treasure because a vibrant system of Catholic schools matters not only to each of the 2 million students who benefit from this faith-based education but that, more broadly, the survival of an alternative to state-run schools is essential to the very health and vibrancy of America's civic culture. Decades of research tell us that no system of schools—charter, private, or public—has demonstrated such documented efficacy (academic achievement, educational attainment, and civic engagement) for children most vulnerable to unsatisfactory schooling (Altonji, Elder, & Taber, 2005; Benson, Yeager, Guerra, & Manno, 1986; Bryk, Lee, & Holland, 1993; Coleman & Hoffer, 1987; Coleman, Hoffer, & Kilgore, 1982; Evans & Schwab, 1995; Greeley, 1982; Grogger & Neal, 2000; Jeynes, 2007; Marks & Lee, 1989; Neal, 1997; Sander, 1996; Sander & Krautman, 1995). Research also tells us that Catholic school graduates are more tolerant of diverse views, are more likely to vote, are more likely to be civically engaged, and even earn higher wages than their public school peers (Dee, 2005; Hoxby, 1994; Neal, 1997). These schools are, as the Director of the Fox Center for Social Entrepreneurship at the University of Pennsylvania, professor John DiIulio (2009) so aptly put it, “sacred places serving civic purposes.”

Furthermore, no system of schools achieves this success with such dramatic economic efficiency, typically educating students at less than half of the cost of neighboring public and charter schools (Ouchi, 2003). As the largest alternative to public schooling, Catholic schools help keep public schools accountable to the public, and their viability ensures that Catholic schools continue to save public schools billions of dollars each year. For example, it costs Chicago city schools more than \$10,000 annually to educate each elementary school student and more than \$13,000 to educate each high school student. By educating 96,197 students in the 2007–2008 school year, Catholic schools in the Chicago area saved the public school system \$1,031,415,280 (Archdiocese of Chicago, 2008). Nationally, Catholic schools save taxpayers more than \$21 billion (McDonald & Schultz, 2011).

Indeed, from a public policy standpoint, it is hard to imagine a shrewder investment than Catholic education. In a nation beset by failed and increasingly expensive policy initiatives aimed at addressing the challenge of improving the education of its youth—especially minorities and the economically disadvantaged—Catholic schools have a proven track record. Unfortunately and sadly, they are most fragile in the very urban and rural areas (National Center for Education Statistics, 2008) where they confer the greatest comparative educational benefit (Bryk et al., 1993; Greeley, 1982; Neal, 1997)—neighborhoods where they successfully serve low-income families, often regardless of their religious affiliation.

So just as Church leaders, parishioners, and educators mourn the loss of Catholic schools as effective venues for transmitting the faith from one generation to the next, so too should civic leaders in local communities mourn the closing of each school as remarkably effective educational institutions that have proven successful at narrowing the American achievement gap for low-income and minority children (Jeynes, 2010). Research tells us that at-risk Latino children who attend a Catholic school are 42% more likely to graduate from high school and two and a half times more likely to graduate from college (Neal, 1997). Similarly, a recent study in Los Angeles found that 98% of low-income minority children who attend Catholic schools graduate from high school in 4 years, compared to only 66% of public school students (Litton, Martin, Higareda, & Mendoza, 2008).

All of this has been accomplished despite the recurrent growth of what many label “the achievement gap.” The effects of this growing achievement gap are far-reaching and dangerous for our country. A recent analysis by McKinsey & Company (2009) determined that achievement shortfalls have dramatic effects on the national economy and the common good. The report found that the achievement gap “imposes on the United States the economic equivalent of a permanent national recession” (p. 6), inhibiting the gross domestic product (GDP) by as much as \$525 billion—or 4% of the U.S. GDP—annually. These findings make it all the more alarming that 18% of Catholic schools—among only a handful of schools that have a researched track record of closing the achievement gap—have closed in the past decade.

Recent research by scholars at the University of Notre Dame documents what happens to vulnerable urban neighborhoods when these fragile “enclaves of social capital” are forced to close and disappear. In ongoing work, law professors Margaret Brinig and Nicole Garnett empirically examine the implications for center city neighborhoods of the rapid disappearance of urban Catholic schools and their gradual replacement with charter schools. Although a great deal has been written about Catholic and charter schools as educational institutions, little is known about how these schools function as community institutions. Brinig and Garnett seek to fill this gap in the literature by measuring how Catholic school closures and charter school openings affect urban neighborhoods in Chicago. To do so, they use comprehensive survey data on disorder and social cohesion collected at the neighborhood level from more than 4,000 respondents by the Project on Human Development in Chicago Neighborhoods in 1995–96, as well as crime data collected at the police beat level between 1999 and 2005. Their initial findings strongly suggest that Catholic elementary schools are important generators of social capital in urban neighborhoods. Even after controlling for numerous demographic variables that would tend to predict neighborhood decline and disaggregating school-closure decisions from those same variables, Brinig and Garnett find that neighborhood social cohesion and collective efficacy decrease and crime and disorder increase following a Catholic elementary school closure (Brinig & Garnett, 2012).

Despite the admirable record of Catholic schools on so many fronts, it is often difficult to argue against the prevailing notion, even (or especially) among many within the Catholic community most committed to these institutions, that the days of vibrant Catholic schools have passed and abide mainly in the memory of a time when every parish had a school (or so it seemed) staffed by nuns and bursting with students. Another painful round of school closures in the first decade of the 21st century has more than erased the modest enrollment gains of the 1990s. The religious administrators and faculty who once staffed the schools are almost gone. Pastors and principals are overwhelmed. Mass attendance is down, as are collections. Faculty salaries are still too low, yet tuition continues to rise. Enrollments, especially in underserved urban and rural areas, continue to shrink. In light of the grim statistics and trends, and in spite of the proven educational success of these schools, one might ask, Is Notre Dame’s mission to work toward a bright future of increasing enrollments and vibrant, financially stable Catholic schools a fool’s errand?

RETHINKING THE STORY: AN ALTERNATIVE VIEW

But perhaps the familiar storyline of decline over the last 45 years should be reconsidered. This is not to deny the painful loss of schools and students, or to suggest that Catholic schools are not facing a real crisis. They are. Yet, when viewed in light of the sudden emergence of daunting

challenges that began to confront Catholic schools in the late 1960s, the common focus on school closures as a sign of systemic obsolescence can obscure the impressive tenacity of these institutions to adapt, survive, and even flourish in a period of tumultuous change. Consider that in little more than a generation, Catholic schools have undergone an almost complete transformation in how they are staffed and how they are financed. The migration of millions of upwardly mobile Catholics from cities to suburbs has altered the original mission of many urban schools, which now frequently educate disadvantaged children of their neighborhoods regardless of their religious affiliation.

America's Catholic schools are the 19th-century product of what has been described by eminent Harvard political scientist Robert Putnam as the most intensive period of social entrepreneurship in the history of the United States. However, as Putnam (2000) also pointed out, the institutions created for one period often must reinvent themselves in subsequent eras. Upon closer inspection, one can perhaps see the stirrings of a new and equally creative age of institutional invention in Catholic schooling. Across the nation, Americans can observe innovative models to find and form faith-filled teachers and leaders, renewed efforts to enhance the quality and identity of faith-based education, and successful initiatives to make Catholic schools more affordable and accessible.¹

And yet, in the midst of considerable reinvention and innovation, one actor is largely absent from the scene: Catholic higher education. Imagine for a moment if fully 80% of the teaching force of the United States were to simply disappear within the span of one generation. This is precisely what occurred in the case of Catholic schools beginning in the mid-1960s, as many priests and professed religious left their congregations at the same time that vocations to the priesthood and religious life dwindled dramatically. There existed no national plan in response to this crisis and absolutely no systematic program to form lay teachers and leaders for Catholic schools. Not surprisingly, as a result of the absence of national leadership, Catholic schools came to rely increasingly on "public education" as *the* model for the professional preparation of Catholic school teachers and leaders. Over the past 40 years, Catholic colleges and universities have generally neglected Catholic elementary and secondary schools. As staffing has shifted from religious to laypeople in P-12 Catholic schools, a parallel process of abandonment has taken place in teacher education programs at Catholic colleges and universities (Watzke, 2005).

Indeed, the closure in 1976 of Notre Dame's once-prominent Department of Education, a department that for nearly six decades had annually educated scores of Catholic school faculty and administrators, and had published a leading research journal in the field of faith-based education, Notre Dame's *Journal of Education*, is a prime example of this disengagement. However, as we argue in this article, it is perhaps in no small part the decision to close Notre Dame's Department of Education that made it possible for Notre Dame to return to the field of education nearly two decades later with a very specific focus on faith-based, and particularly Catholic, schools. As our movement approaches two decades of service, one might well argue with perhaps no small amount of irony that its real beginnings, or at least the seeds of its creation, emerged from this difficult decision made in the mid-1970s by university leadership. In part frustrated by concerns about quality and impact, in part captive to the fad of the season, when the University of Notre

¹Consider the Cristo Rey and Nativity-Miguel schools across the nation; the Jubilee Schools in Memphis, TN; and the stewardship model in Wichita, KS, in which Catholic schools are funded out of the parish offertory and assess no tuition to active parishioners.

Dame shuttered the doors of its Department of Education in the 1970s, it effectively removed itself from playing any meaningful role in improving the schooling of America's children. Meanwhile, in the ensuing years, the challenges faced by many parts of our nation's P-12 educational system, both public and private, reached crisis proportions.

NOTRE DAME'S RESPONSE

In response to this crisis, the University of Notre Dame reentered the field of education in the mid-1990s through a broader series of initiatives united by their dual focus on interdisciplinary approaches and educational reform. In 1996, to house these burgeoning research, teaching, and service programs, Notre Dame created a new academic unit, the Institute for Educational Initiatives (IEI), whose inaugural director, Dr. Maureen Hallinan, then president of the American Sociological Association, had an international reputation as one of the world's preeminent sociologists of education. Hallinan and colleagues from a number of disciplines at Notre Dame were animated by the conviction that education as a field of study is best explored from interdisciplinary perspectives, a conviction that continues to inform Notre Dame's efforts in educational research and in its formation of teachers and leaders for schools. Since its founding, the IEI has attracted 60 Fellows from diverse academic departments (including psychology, sociology, English, political science, law, economics, theology, and business) and has grown to include four distinct programs: the Center for Research on Educational Opportunity; the Center for Children and Families; the Education, Schooling, and Society undergraduate minor; and the nation's premier provider of talent and resources to Catholic schools around the country, the Alliance for Catholic Education.

Indeed, the closure of Notre Dame's Department of Education in the 1970s can perhaps be viewed, as Albert O. Hirschman (1971) put it, as "a blessing in disguise" (p. 29). For, in the absence of a School or Department of Education, the organizational space was relatively clear of entrenched and competing interests that often pose roadblocks and obstacles to rethinking, innovation and reform. The absence of a traditional academic home allowed educational entrepreneurs and reformers the freedom to invent a focused set of synergistic efforts that resulted in the creation of a host of programs aimed at reinvigorating Catholic schools across the country.

Founded in 1993, the University of Notre Dame's ACE program began with 40 recent college graduates who committed to serve as teachers in underresourced Catholic elementary and secondary schools clustered in eight sites across the southern United States. None of these graduates had any academic background in education. They had been placed in schools far from home and had been assigned to live together in small Christian communities with people they did not necessarily know upon accepting the invitation to join ACE. At the time of their acceptance in the spring of 1994, the preparation for their service as teachers was still in the process of being designed in collaboration with the University of Portland, a fellow Congregation of Holy Cross-sponsored institution 2,000 miles from Notre Dame that happened to have a School of Education with a rather entrepreneurial faculty. Notre Dame did not.

Today, the ACE Service through Teaching program supports annually more than 180 highly talented and committed teachers who serve in more than 100 schools from Florida to California (ACE, 2011). These teachers are enrolled in a fully funded, 2-year Master of Education degree program at Notre Dame, which leads to certification in dozens of states across the country. Since 2002, ACE has also prepared principals for Catholic schools through the Mary Ann

Remick Leadership program, which offers a Master of Arts in Educational Administration to its nearly 100 faith-filled and experienced professionals in all regions of the United States. Two 18-credit certificate programs, English as a New Language and Teaching Exceptional Children, educate Catholic school teachers to meet the needs of their students more effectively. ACE Advocates organizes the more than 1,500 and growing graduates (and like-minded friends) as a movement in service to schools and children, especially those who live in poverty and lack educational opportunity. Over the past 5 years, ACE has developed a suite of programs to provide professional services and outreach for underresourced Catholic schools, including but not limited to ACE Consulting, Notre Dame ACE Academies, Play Like a Champion Today, and the Catholic School Advantage campaign. As of 2012, ACE supports almost 70 full-time faculty and staff. One thing hasn't changed after 19 years: Notre Dame still does not have a School or Department of Education. Indeed, there exist no plans to build one.

Although the university has returned to the field of education in unconventional ways, we wish to state up front that our purpose in sharing lessons from our experience is not to insinuate that more traditional schools or departments of education are inherently problematic or inevitably allied with forces of stasis and mediocrity. Far from it. At the same time, as the IEI and ACE have grown, we have given substantial thought to the context of education at Notre Dame and have become increasingly convinced, assisted in large part through external reviews conducted by scholars and fellow travelers—including such professors as Lee Shulman, Anthony Bryk, Sharon Feimann-Nemser, and Mary Diez—that the university's late return to the field of education in the absence of an established school or department of education represents an advantage, allowing Notre Dame to pursue its particular mission with sharp and steadfast focus and to respond to opportunity with a nimble and entrepreneurial spirit. The structure of the IEI has liberated the university's research and work from paradigms often resistant to change. Institutions of Higher Learning, especially smaller, private, and faith-based ones, often operate at or near the margin financially and are therefore often constrained in their programmatic choices. Most are left with little alternative but to make peace with the status quo (including, e.g., entangling institutional arrangements with public school districts and states, and teachers' unions) and where professional reputations and livelihoods are very much at stake.

True, the structure of the IEI would seem to pose certain limitations with respect to faculty recruitment and retention, as any tenured position must be held in a cognate department, such as within psychology, sociology, political science, or economics. Fortunately, this has not proven to be an insurmountable barrier and, in some respects, has actually strengthened the intellectual resources available to its efforts. The essential interdisciplinary focus of the Institute's approach to the problem of education has allowed it to recruit and retain nationally prominent scholars such as Maureen Hallinan and Mark Berends in sociology, as well as Daniel Lapsley and the late Michael Pressley in psychology, and Nicole Garnett in law. The very absence of an independent School of Education provides a permanent incentive for faculty from diverse disciplinary backgrounds to collaborate with each other and reach across departments and traditional disciplinary boundaries. Moreover, Notre Dame offers a parallel professional track for faculty who do not hold tenure in an academic department, and this structure has allowed the university to attract first-rate faculty (with doctorates in fields as diverse as physics and education) who are driven fundamentally by a commitment to the mission. Indeed, a number among the school's professional faculty have left tenured or tenure-track positions at other universities to join the efforts at Notre Dame.

The remainder of this article traces the story of one faith-based national university to serve the pressing needs for enhanced educational access and improvement among faith-based schools—principally Catholic schools—throughout the United States over the past decade and a half. In particular, the article describes the efforts of the University of Notre Dame to bridge the resources of American higher education to P-12 schools throughout the country, beginning with ACE and its service to faith-based schools, but subsequently branching out to consider ways to respond to the needs for school improvement among public schools as well. Drawing upon lessons learned, both through failures and successes, our reflections may suggest ways to strengthen the roles that American institutions of higher learning may play in improving the quality of education at faith-based, private, and public schools across the United States. Time and again we have learned and relearned the axiom that necessity is the mother of invention. Our most successful ideas, innovations, and activities have been born out of two consistent realities: an attempt to respond to specific, often profound, needs in P-12 schooling and the fruitful alliances formed with those people and institutions who articulate their needs and their desire to work together to address them.

In addition, this article identifies and explores key themes that have emerged during the development and growth of new initiatives at Notre Dame, which are characterized by a profound emphasis on the value of the “alliance” between the university and its P-12 partners. When these efforts have flourished, momentum typically comes from vibrant institutional partnerships marked by a spirit of respect, interdependence, and shared passion to establish a culture of continuous improvement. When these efforts have failed or fallen short of our hopes, we typically note fissures or institutional asymmetries that hamper generative partnerships. The challenge is to imagine creative ways to adapt these lessons to meet new circumstances, problems, and opportunities, always with a singular focus on how best to strengthen America’s schools, especially those that serve children from “at-risk” demographics.

Crisis as an Invitation for Innovation

Catholic schools emerged in the United States as a response to the experience of a mostly urban immigrant Catholic community beginning in the mid-19th century. That experience was one largely characterized by a sense of social unwelcome and cultural marginalization, and resulted consequently in the need to build a set of schools where Catholic Christians could live and teach their faith, and Catholic Christianity was welcome. The story of the building of this extraordinary civic asset, the Catholic school system in the United States, has been told elsewhere, and there is no need to repeat the story here (McGreevy, 2003; Walch, 1996). But one element of that story is essential to recall. The creation and subsequent sustainability of this remarkable system of schools depended on a massive subsidy of exceptional talent and generosity on the part of hundreds of thousands of religious sisters and brothers. Their presence in the schools as leaders and teachers, coaches and guidance counselors, meant that the schools could offer rich educational services at a fraction of the real cost to the Catholic community. The virtual disappearance of these vocations to the Catholic religious life, in a relatively short period, changed the financial and governance equation upon which these schools depended suddenly and dramatically.

Large and long-standing organizational systems, such as had become the Catholic school system in the United States, are generally both subject to inertia and resistant to change. The

rapid transition in human resources caused by the reduction of the aforementioned vocations was accompanied by dramatic Catholic demographic shifts away from the city to the suburbs. These changes raised questions within the Church about the very need for these schools in a post-Vatican II America. And so, perhaps not surprisingly, most of the leadership charged with the stewardship of this apostolate—both the National Catholic Educational Association as well as the National Conference of Catholic Bishops—proved unable or unwilling to forge an effective strategy to renew Catholic schools or to marshal broad support for them among clergy and laity. Sadly, with no national plan in place to facilitate the transition from an overwhelmingly religious personnel to an almost entirely lay-led system, Catholic elementary and secondary schools entered into a period of relatively precipitous decline and crisis, which was most acute in urban and rural areas.

But real crises often have a way of garnering the attention of organizational leaders. And the challenges that beset the Catholic school system were, and continue to be, both real and potentially life-threatening. By the time ACE began its efforts in 1993, the crisis undermining the future viability of urban Catholic schools was well under way. When Sean McGraw and Tim Scully began reaching out to Catholic school leaders in the South to ascertain their level of interest in enlisting the professional support of relatively young and inexperienced Notre Dame graduates in their classrooms, the response on the part of school superintendents was nearly cathartic enthusiasm. The response of bishops was equally positive.

The history of ACE exemplifies how the explicit needs confronting Catholic schools, experienced so acutely by the 1990s in the southern United States, contributed to an openness to experiment. To cite the need of the dioceses and schools that initially took risks with ACE is not to suggest that these institutions were generally ineffective or failing. Although some schools were in deep trouble, many of these schools and systems had entrepreneurial leaders who refused to be lulled into complacency, in part because their schools' academic reputations still exceeded that of the neighborhood alternatives. But these leaders realized that the small Catholic population and the low density of Catholic colleges in the South exacerbated the challenge of finding lay faculty, especially as religious leaders retired or left. Recognizing the confluence of powerful forces undermining the future vitality of their schools—perhaps the two most significant being the financial pressures of the tuition model on student enrollment as well as the deep challenges of attracting and retaining strong teachers given the salary gaps between their faculty and those who worked in the public sector—many leaders became more open to risks out of concern for the diminished flow of teachers wanting to work in Catholic schools and embrace their mission. Concerns about succession, therefore, ultimately led many of these leaders to risk partnership with ACE, and, indeed, to seek it and to assist energetically in its design and continual improvement.

This appetite for risk born of need and opportunity explains why a university located in Northern Indiana without a Department of Education launched an alternative education initiative that placed its teachers hundreds of miles away in the South. With few Catholic universities in the region and a disproportionately small Catholic laity to staff and lead the schools, superintendents in the South were open to collaborate with Notre Dame even though it was so far away. Both Notre Dame and the University of Portland, its initial institutional partner, were willing to take on the challenge. Even more important, ACE participants, most of whom came from the Northeast or the Midwest, embraced the opportunity to work far from home. Ironically, the decision to send teachers hundreds of miles from Indiana and thousands from Oregon, which certainly posed logistical challenges, represents another example of a seeming disadvantage proving essential to the structure, character, and success of the program.

In hindsight, the geographical distance inherent to ACE's collaboration with dioceses in the South and, as the program expanded, Southwest has actually offered a series of unintended benefits. From the outset, ACE attracted candidates who brought with them a strong sense of adventure, coupled with a powerful motivation to see their teaching as service. In addition to enhancing the sense of mission among the ACE teachers, the great distances necessarily strengthened the role of the local leadership (mentors, principals, superintendents) and prevented program faculty and administrators from overshadowing the vital roles of the local practitioner. It also encouraged the pioneering ACE participants to develop a blend of self-sufficiency and mutual support in the context of their community. ACE faculty and staff visit each semester, but ACE teachers also have the freedom and responsibility to make their own way. This is not to say distance has been an unequivocal benefit, yet the benefits have outweighed the costs, as distance has imposed a set of challenges that have led to improvements in the model of supervision. It also had the effect of enhancing the role of community in the growth of teachers—colleagues who helped one another and supported one another in an environment where they could not fall back on the comforts of home but had to create a new home in new and often challenging settings.

Since the founding of ACE nearly two decades ago, the sense of crisis and decline among the leadership of the Catholic Church has only deepened, and the attendant openness to innovation and experimentation has increased (Hamilton, 2008). Diocesan and school leaders are often hungry for effective solutions, and are willing to explore new directions that might have been off-limits in other scenarios. ACE has experienced this sense of openness in a wide variety of initiatives, ranging from leadership formation programs to professional services. The ACE Service through Teaching program has formed nearly 1,500 talented and committed educators and now serves in nearly three dozen cities from coast to coast. The Mary Ann Remick Leadership program, with hundreds of Catholic school principal candidates leading schools across the country, has become the premier provider of leadership talent for Catholic schools across the United States. Of late, ACE has fashioned two initiatives to increase the capacity of Catholic schools to respond to the increasingly diverse learning needs of students. In addition to its two degree programs, ACE offers two 18-credit certificate programs, one for educators who work in Catholic schools with English language learners (the ENL program) and a second for those who seek greater expertise in working with students who have mild to moderate learning differences (the TEC program).

With more than 1,700 Catholic schools closing in the past decade, the times call for bold measures and for imaginative thinking about a multitude of challenges. In this context, we continue to consider how Notre Dame might contribute robustly to the transformative professional development of teachers and school leaders. Is there anything that the university might do to improve the institutional viability of many Catholic schools that, for all of their fragility, continue to provide excellent education for the common good? In response to these and other urgent questions, we created a nonprofit professional consulting organization, ACE Consulting, to find, develop, and share best practices with Catholic schools and dioceses and to explore financial and governance arrangements that have proven useful in the current complex and challenging environment.

In partnership with prominent national foundations, ACE has also created a model for comprehensive school transformation, the Notre Dame ACE Academies, which opened its first set of schools in Tucson, Arizona, with more to come in the future. Notre Dame ACE Academies are based on the premise that faith-based schools serving at-risk populations, over the longer term, must rely on public-private partnerships, such as innovative state personal and corporate

tax credits, if they are to continue to be financially viable. Therefore, Notre Dame will only open and operate these academies in host states that favor genuine choice for parents and children.

Great Talent Hungers for a Worthy Challenge

In the autumn of 1993, when McGraw and Scully were wondering if there might be any interest among Notre Dame's graduating seniors to serve as teachers in the underserved classrooms of the South and Southeast, they took out an ad in the student newspaper, *The Observer*. "Tired of Getting Homework? Then Give Some—Be a Teacher!" Thinking that that they might get a dozen or two candidates, they were shocked when they walked into the room in the Notre Dame Student Center to discover nearly 200 students in the room, anxious to hear about the invitation. Among these were many of the leaders of the graduating class, both in terms of academic achievement and campus life. At that point, given the enthusiastic response of the superintendents in the South and the excitement among the graduating seniors, they suspected that they had found a match.

As ACE has grown, the organization has learned never to underestimate the allure of teaching and the field of education for very bright, highly motivated young people. Many of these young people are drawn to the vital mission and strong sense of community present in education. Their dual sense of purpose and belonging connects with the Catholic tradition, where the ministerial identity of "teacher" is both understood and embraced by young people eager to serve the common good. Much like Teach For America, ACE has attracted first-rate talent at Notre Dame and other highly competitive colleges and universities. Over the last few years, the Service through Teaching program has had roughly five applicants for every teaching placement, and the average undergraduate GPA from top-tier colleges and universities exceeds a 3.5 for those accepted to ACE. One feature perhaps unique to ACE in the world of postgraduate service programs is that it continues to attract high numbers of talented male applicants to a field in which men are underrepresented. Since its inception in 1993, fully half of the 1,500 ACE teachers and graduates are male. Superintendents and principals consistently note the value of ACE teachers, male and female, for their work and service beyond the classroom, and they also highlight in a particular way the intangible role played by male ACE teachers for children who, regrettably, have few if any positive adult male role models in their lives.

Perhaps the biggest and best surprise of ACE may be what DiIulio referred to as the "stick-rate" for the program's graduates. To this point, more than 70% of ACE STT graduates remain in education, the majority in elementary and secondary schools as leaders and classroom teachers. An important subcategory within this group, approximately 7% of those still in education, have earned or are currently in the process of earning doctoral degrees in education or related fields (e.g., policy and counseling psychology). If one considers our most recent graduates—within the last 5 years—the "stick-rate" is even higher, more than 80% percent (ACE, 2011). To be sure, the trend line dips downward over time as comparatively low salaries, family commitments (stay-home mothers and fathers), and the rekindling of other professional interests draw our graduates away from the field. But this downward trend is remarkably low, particularly for a profession characterized by high attrition. In fact, many who join ACE with plans to go into other lines of work upon completing their 2-year service commitment find themselves hooked, drawn to the mission and the work and grateful for their M.Ed. degree and the ability to obtain a teaching license.

Although the majority of this group remains in Catholic schools, a significant number have migrated to private, public, and charter schools, an example of how ACE supports, over time, diverse sectors of P-12 education. Perhaps less surprising, but equally important given the mission of the program, is that nearly 100% of the graduates of the Remick Leadership program currently have administrative roles in Catholic schools. ACE thus serves as a credible witness to the possibility that talented men and women can not only be attracted to the profession, from classroom teacher to school leader to scholar in the field, but also be retained for goodly lengths of time.

Better Together: The Importance of Alliances and Partnerships

From its very beginnings, ACE has relied upon strategic partnerships to deepen and expand the resources that could be drawn upon to achieve our objectives. We sometimes joke that at the program's birth, the acronym "ACE" actually preceded the full name. Settling on "alliance" as the final choice has, in hindsight, taken on a certain prophetic element, as the signature of Notre Dame's efforts in education remains its capacity to form powerful networks and collaborative partnerships among a variety of diverse stakeholders—from national ecclesial and professional organizations such as the United States Conference of Catholic Bishops and the National Catholic Educational Association to individual dioceses and schools. In addition, the university sought from ACE's inception to build strategic alliances among institutions of higher education, philanthropic organizations and benefactors, as well as the federal government's then newly formed Corporation for National Service (now the Corporation for National and Community Service [CNCS]).

As important as the M.Ed. and MA in Educational Leadership degrees and the pastoral/administrative support have been to ensure ACE's high retention rate (historically around 95%), program evaluations consistently reveal the fundamental formative significance of their experience serving as teachers and leaders in their schools, in which mentor teachers, principals, and even diocesan superintendents (who frequently form personal relationships out of hospitality and genuine care) play instrumental roles in their development as professional educators. To place such responsibility on local educators already stretched and undercompensated could seem a poor blueprint for success, and in some cases ACE has left schools or declined the invitation to serve because we determine their capacity insufficient to support new teachers effectively. It is true that both principle (the Catholic social teaching of subsidiarity) and pragmatic considerations (financial struggles) keep Catholic schools and systems (a word we use with caution in that dioceses are rarely organized as a system in any way analogous to a public school district) chronically lean with respect to administrative staffing, especially relative to neighboring public districts. In retrospect, however, the relationships formed between ACE teachers and their mentoring colleagues are, more often than not, a source of profound formative value. This is certainly the case for the ACE teachers, but not infrequently for local colleagues who find themselves inspired by the enthusiasm of these new teachers who bring with them the latest research about effective instructional planning, pedagogy, and assessment. The generous investment of time exhibited by local educators around the country to help ACE participants navigate the shoals of beginning teaching and new leadership is the heart and soul of the "alliance" at the center of the program's success. This is not to say that more human and financial resources would not be welcome at most dioceses and schools, but the lean staffing in both the diocesan and school contexts has yielded some unintended advantages to building university/P-12 partnerships, which thrive in large part

because local educators take ownership for the professional development of those serving through ACE and, on a systemic level, because the dioceses and their schools are resistant to bureaucracy. When red tape is minimal, decisions and actions to intervene to assist a struggling teacher, for example, move rapidly and offer optimal chance of success.

Another crucial early partner in building ACE was the Corporation for National Service through its AmeriCorps program. At the very time that ACE was taking shape in the early 1990s, the Clinton administration was moving toward a major national initiative to catalyze the growth and effectiveness of service organizations across all sectors of American civil society. The question arose in the minds of the ACE leadership: "Could faith-based organizations participate in this movement?" After numerous visits to Washington, DC, and conversations with the founding Director of the Corporation, former senator Harris Wofford, the answer was "yes," and a vitally important partnership emerged. Although financial resources from the CNCS has never exceeded approximately 15% of the ACE overall budget, the partnership with AmeriCorps has been important to ACE in multiple ways, providing national visibility and credibility and enabling the recruitment and participation of a more diverse pool of candidates (those with Perkins or Stafford student loans could apply their education awards of—until recently—\$4,725 for each year of service to reduce their debt). From a policy perspective, this partnership allowed the faith-based community to become a more visible part of the national conversation addressing service learning.

Although the CNCS has been and continues to be a vitally important partner, corporate and private foundations and individual benefactors have also become important collaborators in this broad alliance. Many supporters indicate their enthusiasm for a program that combines Notre Dame's reputation for high ethical standards and transparent stewardship with effective outreach to faith-based schools that have such a strong track record for effective outcomes with students. Drawn to the efficacy of this national alliance between higher education and Catholic elementary and secondary schools, the philanthropic community itself has become an important part of a larger alliance, encouraging rigorous evaluation and improvement of current activities and an openness to new ideas and initiatives.

In our experience, meaningful partnerships among a broad set of institutions of higher education are relatively rare. Colleges and universities spend most of their time competing with, not cooperating with, one another. This is no less true among the approximately 225 Catholic colleges and universities in the United States. But the widespread need of faith-based P-12 schools has drawn together a number of Catholic universities (along with additional religious, private, and public universities) to form various collaborative efforts in close dialogue with Catholic P-12 schools and systems.

Without the initial support and the encouragement of generous entrepreneurial colleagues at the School of Education at the University of Portland, it would have been impossible to prepare and license our teachers during ACE's first 4 years. The faculty at the University of Portland frequently traveled to Notre Dame's campus as well as to ACE sites across the South to help build a faith-based alternative teacher formation program that was based on the best available theories and praxis. After a short while, the ACE Service through Teaching program outgrew the capacity of Portland's faculty, presenting the effort with a serious challenge. Fortunately, ACE was able to recruit a team of scholars and educational entrepreneurs who worked hard to build an innovative and highly successful formation program, based upon three "pillars": first-rate *professional development*, intentional Christian *community*, and a particular focus on growth in the *spiritual life*.

Faced with great demand for ACE teachers by dioceses around the country, ACE opted to engage other faith-based partners in higher education to meet this national opportunity. What coalesced became known as the University Consortium for Catholic Education (UCCE), now with 17 member institutions in all regions of the country. The UCCE exemplifies an explicit decision to facilitate growth by forming additional partnerships within higher education. The Consortium also provides technical assistance when asked but does not attempt to “clone” ACE at other institutions. The key elements prevail, such as the three-pillar model of professional education, community, and spirituality. But each institution in the UCCE has the freedom to pursue its own practices within this larger thematic framework. All other UCCE members have Schools or Departments of Education. Some prepare their teachers in a cohort model like ACE does; others enroll their members in courses with graduate students from other education programs to take advantage of economies of scale.

A Vibrant Coherence with the Broader University Mission

The University of Notre Dame (2012) proclaims as its core mission to

cultivate in its students . . . a disciplined sensibility to the poverty, injustice, and oppression that burden the lives of so many. The aim is to create a sense of human solidarity and concern for the common good that will bear fruit as learning becomes service to justice.

In a very real and direct way, the broader institutional mission of the university shares a deep resonance with the mission of the ACE to “strengthen, sustain, and transform Catholic schools.” This shared mission becomes especially apparent when one reflects upon the larger social justice dimensions of the work of Catholic schools in service to the urgent educational need of at-risk and minority populations. So important are the issues of educational access and the achievement gap, what many have called the civil rights issue of this era, that for the 2011–12 academic year Notre Dame president, Reverend John Jenkins, C.S.C., has made education the topic of the university’s Presidential Forum, a yearlong conversation on a select theme that brings distinguished speakers and scholars to campus. Indeed, Notre Dame students have a certain “elective affinity” for service, with more than 80% of the student body engaging in some form of active service while they are students, and more than 10% of its graduating seniors performing full-time volunteer service after graduation, with education being the number one area of service. It should come as no surprise, then, that the broader Notre Dame community shares a deep affinity for the mission of ACE.

From its very beginnings, ACE has enjoyed institutional support from the highest levels and across the university community: Notre Dame trustees, administration, faculty, alumni, and students have been remarkably supportive and excited by ACE and its emphasis on service, and the support has come in more than mere “lip service.” Remarkably, the provost of the university, Tom Burish, has forgone collecting the tuition revenues from each and every one of the more than 1,500 participants who has participated in each of ACE’s several graduate formation programs over the past 18 years, and he continues the practice, from ACE’s inception, of underwriting the expenses of summer housing. The university has also encouraged alumni and benefactors to become involved, resulting in a relatively strong financial position for the program.

From the outset, there has been plenty of healthy internal discussion and debate about tactical and even strategic questions: What are the optimal sizes of ACE’s various formation

programs? How does the organization measure its impact on student achievement and school improvement—in short, how does ACE know that it is making a difference? When does the university decline invitations to serve and by what criteria? As ACE and IEI have grown, how effectively are they taking advantage of potential synergies among various units? Because ACE seeks to cultivate a community united by its conviction to the value and importance of its fundamental mission—one consistent with that of the larger university—there is a high level of trust, even amid disagreements, between students, faculty, administrators, and external partners, allowing these individuals to share ideas and concerns honestly.

Getting It Right: The Convergence of Context and Program Design

One of the most powerful lessons the University of Notre Dame has learned, through both its successes and setbacks, is the need to understand as fully as possible the market for potential programs and to design programs attractive to all those making an investment—clients, participants, and benefactors. One reason that ACE flourished initially and expanded quickly had to do with the high demand for enthusiastic, talented, and dedicated teachers. Word spread rapidly from diocese to diocese, often because of high levels of trust and strong personal relationships among school leaders. Dioceses and schools approached Notre Dame to join the alliance. This represented a nontrivial benefit, especially on occasions when our teachers did experience struggles in the classroom. Subsequent programs within ACE have typically emerged in response to specific needs where pent-up demand is a key driver.

Consider the Mary Ann Remick Leadership program, which began in response to two related demands. On a microlevel, increasing numbers of ACE graduates expressed interest in becoming school leaders and wondered if and how ACE might respond to these inquiries. On a macrolevel, by the late 1990s, where professed religious individuals comprised less than 5% of all teachers in P-12 Catholic schools, they still served as principals in roughly 50% of these schools, and many superintendents, pastors, and bishops saw that the next two decades would see this percentage drop dramatically. Rising demand for well-formed principals capable of continuing the tradition of academic excellence and strengthening the Catholic identity of these schools spurred the development of another formation program within ACE. Initially configured as a certification program leading to an administrative license, but soon expanded to become ACE's second master's degree program, the organization's 26-month Master of Arts in Educational Administration program now enjoys a substantial endowment, a national network of clients at both schools and dioceses, and strong interest among candidates from Florida to Alaska.

Yet things have not always gone well, exemplified by the Institute's recent efforts to broaden its outreach by developing a program to form leaders for public and charter schools. Many things were in place from the supply side. There was widespread enthusiasm among IEI faculty and university leadership for this project. The university had received substantial financial backing from a prominent foundation. The Mendoza College of Business shared this excitement and, together with IEI faculty, designed a program in which participants would receive an Executive MBA augmented by a suite of courses drawing on Notre Dame's strengths in ethics and moral education. Confident that the MBA degree would attract strong candidates for school leadership and provide a different, and difference-making, set of skills and networks, Notre Dame designed the program and its cost structures without fully testing them in the marketplace. Months later,

after visiting with more than 90 districts and charter management organizations in Indiana, Michigan, and Illinois, we found only sporadic interest and several obstacles to the model that had seemed to make so much sense from the perspective of Notre Dame's assets and strengths. As it turned out, the prestige attached to an MBA degree, offered at a 50% discount, proved insufficient to overcome market pressures facing potential candidates and school districts. The timing proved to be inauspicious as well, as we began to market the program in the midst of the recent economic downturn, which severely constrained the budgets of districts and made candidates more risk-averse about financing this innovative (and therefore relatively unproven) route to educational leadership. Ultimately, the program was cancelled, though not without a valuable lesson. Additional analysis of the demand for this program on the front end would likely have led the university to reconfigure it dramatically or to look for other ways to serve public and charter schools, which Notre Dame is currently actively exploring.

Building a Movement Through ACE: Always Changing Everything

At some point in ACE's initial summer session, the first cohort of teachers, grappling with the latest tweak in their nascent program, began to joke that ACE really stood for "always changing everything." What began as a wry observation remains, on a deeper level, no less true after almost two decades. The observation has become a type of institutional mantra across the organization, which now supports 10 distinct units and almost 70 full-time faculty and staff, not to mention numerous visiting faculty members who come to campus during the summer to teach in the four academic programs. ACE has established a restless, entrepreneurial, and forward-looking culture that is opportunistic and focused on the continuous improvement of its current efforts. As we look back on the program's founding and growth, we note a consistent and, we believe, creative tension between an opportunistic approach and methodical strategic planning, what we sometimes call "improvising on providence."

Consider, for example, the outgrowth of the 2005 Notre Dame Task Force on Catholic Education. Troubled by the financial travails afflicting urban Catholic schools, the task force obtained a grant to conduct a series of regional workshops with bishops and pastors in an effort to draw attention to questions of school governance, management, and financing. The task force's preliminary planning conversations and exercises revealed that the challenges were a good deal more complex (intertwined with issues of school leadership and changing demographic realities to name but two) than anyone had originally foreseen. Fortunately, the Task Force on Catholic Education's philanthropic partner was open to a midstream change of plans, a change catalyzed by a 2005 pastoral statement of the United States Conference of Catholic Bishops, *Renewing Our Commitment to Catholic Elementary and Secondary Schools in the Third Millennium*, in which the bishops invited Catholic higher education to more robust engagement. What began as a modest project then morphed into national task force, headquartered at Notre Dame. In December 2006, the University released *Making God Known, Loved, and Served: The Future of Catholic Primary and Secondary Schools in the United States* (Notre Dame Task Force on Catholic Education, 2006). The findings of the national task force make five general recommendations to the Church and larger civic society as well as 12 specific actions that Notre Dame could take. This report has proved to be an inflection point in the growth and development of ACE, which has added the array of professional services and outreach to Catholic schools noted above and more than doubled its budget and faculty and staff in 4 years.

In December 2008, Notre Dame convened a second national task force, this time in response to a crucial observation of its first task force—to study why Latino children are dramatically underrepresented in Catholic schools when these schools yield such impressive results. Only 3% of school-aged Latinos attend Catholic schools. The data show, however, that Latino children in Catholic schools attain higher educational achievement. Beyond the fundamental drive for social justice, there is a compelling demographic imperative to serve Hispanic children more effectively, for by 2050 more than 30% of all Americans will be Hispanic. Among this population, only half are likely to graduate from high school if the status quo remains unchanged. For the sake of Latino children and the nation itself, this must change; Catholic schools are a proven means to enact this change.

The report of this Notre Dame task force, *To Nurture the Soul of a Nation: Latino Families, Catholic Schools, and Educational Opportunity*, was released on December 12, 2009, the same day as the Feast of Our Lady of Guadalupe (Notre Dame Task Force on the Participation of Latino Children and Families in Catholic Schools, 2009). Upon its publication, ACE launched the Catholic School Advantage Campaign, which seeks over the next decade to double the percentage of Latinos in Catholic schools, raising their national enrollment from less than 300,000 to more than 1 million. This campaign is headquartered at Notre Dame and engages all units of ACE in relevant ways to advance this mission.

Interest in this program is very broad, involving stakeholders from a variety of sectors—Church, education, government, business, philanthropy, and Latino communities. With nearly 700,000 empty seats in Catholic schools nationwide, there is enormous untapped potential to provide Catholic schooling to more children and to give underresourced schools a new energy and purpose. The campaign is already sparking a multitude of dynamic collaborations and strategic planning exercises in dioceses and schools across the country, and ACE has entered into innovative collaboration with six (arch)dioceses in the country—Los Angeles, Chicago, New York, Brooklyn, San Antonio, and Oakland—where opportunity abounds to provide a high-quality Catholic education to more Hispanic students, first by filling empty seats and, as demand and access to Catholic schooling expand over time, by reopening closed schools.

CONCLUSION: SAILING INTO THE WIND

When it comes to addressing long-standing stubborn problems facing complex social organizations such as those facing Catholic schools in the United States, there exists no all-encompassing solution, no master key that yields simple solutions. As Hirschman (1963) once noted with characteristic wisdom, the temptation to search for a single, all-at-once, fundamental solution, what he called “the rage de vouloir conclure” (p. 238), despite its allure, must be resisted at all costs.

Perhaps an apt metaphor for engaging—and reinventing—multidimensional and somewhat intractable organizational change might be “sailing into the wind.” When headwinds are impossibly against the sailor, one sometimes has no choice but to “tack,” never really aiming at the intended goal or destination directly, but rather moving at angles and in directions that can even be perceived to be at odds with the ultimate destination. Just so, solutions do not appear as an “either-or,” “all or nothing,” but rather as a “maybe yes, maybe no.” Stubborn problems do not

need to be solved all at once; in fact, they usually cannot be. Rather, change and reform is often partial and grudging. Little by little the ship makes progress.

Given this, what ACE has attempted to do is surround many of the stubborn and complex problems facing Catholic schools in America with a suite of institutional responses, each of which is intended to encourage progress in a very targeted area of need. In this sense, instigating change in complex organizations often involves deep paradox, inviting a search for relationships that permit strength to be drawn from alleged weakness. As Hirschman (1963) again argued, “acknowledged well-entrenched obstacles to change” must be “neutralized” or “outflanked,” and “conditions and attitudes . . . inimical to change have a hidden positive dimension and can . . . come to serve and nurture progress” (p. 6).

ACE often wonders what “avenues of escape” (Hirschman, 1971, p. 29), which are often hidden in the midst of the very problems for which we seek solutions, are available to the organization. For example, ACE has pointed out the administrative “leanness” of diocesan and archdiocesan central staff, a dearth of personnel in the central office which is often (and rightly) seen as a fetter to school improvement. However, at the same time, this very leanness has provided the program’s efforts with a “blessing in disguise,” ensuring a degree of engagement and ownership at the highest levels of leadership in the professional and even personal lives of its young teachers and leaders. There’s simply no one else around to engage them. Perhaps the same can be said about the distance separating ACE’s campus efforts at Notre Dame in South Bend, Indiana, from the hundreds of teachers and school leaders serving schools across literally every state in the nation. The very distance separating ACE headquarters from its movement participants acts as a spur, rather than a fetter, encouraging the engagement of school partners at every level. In other words, what the program has consistently attempted to do as a movement is discover opportunities for progress in the midst of the very organizational limitations imposed by the problems themselves. Hirschman called this a “possibilist” approach (1971, p. 29) to “reform mongering” (1963, p. 276).

We have spoken at some length of the “blessing in disguise” that the absence of a formal Department or School of Education has provided for the growth of the movement. This absence has invited an active use of the power of imagination, and encouraged Notre Dame to discard common apprehensions and paradigms that sometimes hinder, and even strait-jacket understanding. Again, for Hirschman (1971), “long acquired habits of thought” cling stubbornly to systems and paradigms, which can obscure the elusive dimensions of social reality (p. 15). Although there certainly exist costs in not sponsoring a School of Education, the benefits to ACE’s efforts have outweighed them.

As we discussed at the very outset of this article, “crises” can lead to opportunities that previously did not exist. There can be little doubt that the depth and breadth of the crisis facing Catholic schools across America has led ecclesial leaders throughout the Catholic Church—from bishops, to superintendents, to principals and others—to consider actively reforming areas such as accountability and school governance, which were issues previously held off the table. In this sense, the crisis confronting these schools represents an unprecedented opportunity for rethinking and reinventing faith-based education in this country. Whether the collective efforts of Notre Dame and its sister institutions will be “too little too late,” or rather will succeed in catalyzing a national movement which will ultimately save these “sacred places serving civic purposes” that have been so crucial to vibrancy of American civil society remains to be seen. We at Notre Dame are betting on the latter, and clinging to the hope that the Holy Spirit will continue to inspire what former Secretary of Education Margaret Spellings (2005) called these “national treasures.”

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Reflections on the Law and Curricular Values in American Schools

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The Supreme Court's 1925 ruling in *Pierce v. Society of the Sisters of the Holy Names of Jesus and Mary* (*Pierce*), striking down a law from Oregon that would have required all children, other than those needing special education, between the ages of 8 and 16 to attend public schools, essentially upheld the right of nonpublic schools to operate. At the same time, the Court recognized that state officials could "reasonably . . . regulate all schools, to inspect, supervise, and examine them, their teachers and pupils" (p. 534). However, in practice, other than health and safety code issues, educational officials typically impose fewer restrictions on nonpublic schools than on public schools, particularly on curricular content. In light of the significant curricular differences between public and nonpublic schools, this two-part article reflects on how educators in both systems can learn from one another as they seek to ensure the presence of diversity of educational perspectives in the marketplace of ideas. The first part of the article examines legal developments on selected curricular issues, and the second section offers recommendations on how educational leaders can work to maintain the vibrancy of American schools by affording parents the opportunity to send their children to study in schools best meeting their needs.

INTRODUCTION

From the earliest days in America, starting with laws enacted in the American colonies in 1642 and 1647, there has always been the recognition that because education is a local concern parental control is of paramount importance. In fact, the latter of the two laws, the "Ye Olde Deluder Statute," so named because it promoted the use of the Bible as the primary means to defeat the devil in leading believers to salvation, required local communities to establish local school boards to hire teachers while directing the largely religious curricular content for students (Commager, 1965). Of course, as American public schools grew, their instructional programs and curricula took on an increasingly secular nature, such that today there are essentially two parallel systems of education in the United States—public and nonpublic. The vast majority of these nonpublic schools are religiously affiliated. As discussed later in this article, although the

public and nonpublic school systems serve slightly different goals by virtue of their secular and religious natures, there is a great deal that they can, and do, learn from each other in their daily operations, particularly when addressing such a sensitive topic as sexuality education.

Almost 300 years after the enactment of the first education laws in North America, the Supreme Court ruled in *Meyer v. Nebraska* (1923), one of its earliest cases involving education. The Court's decision invalidated a state law forbidding instruction in specified foreign languages, most notably German, in the wake of World War I. In a key part of its rationale, the Court invalidated the law because it arbitrarily interfered with the federal constitutional right of parents to direct and control the upbringing of their children.

Two years later, in *Pierce v. Society of Sisters*, which centered around a dispute over a compulsory attendance law, the Supreme Court made two significant points. First, the Court acknowledged that "the child is not the mere creature of the state; those who nurture him and direct his destiny have the right, coupled with the high duty, to recognize and prepare him for additional obligations" (p. 535). In fact, following the *Pierce* decision, the Court subsequently focused on parental rights, consistently acknowledging that the Constitution protects "the fundamental right of parents to make decisions concerning the care, custody, and control of their children" (*Troxel v. Granville*, 2000, p. 66). Pursuant to the *Pierce* Court's allowing parents to send their children to nonpublic schools, the judiciary has since conceded the right of parents to educate their children at home (*Murphy v. Arkansas*, 1988; *Peterson v. Minidoka School District No. 331*, 1997) or to withdraw their older children from schools altogether (*Wisconsin v. Yoder*, 1972).

Second, the Supreme Court reasoned that the parents in *Pierce* had the right to send their children to a religiously affiliated nonpublic school or to a private military academy, undoubtedly because of the instructional programs that these schools provided. In so ruling, the *Pierce* Court essentially created a Magna Carta for nonpublic schools, recognizing their right to exist, thereby enriching American educational diversity.

Although the constitutional right of parents to direct the upbringing of children restricts only the government, nonpublic schools—particularly those that are religiously affiliated schools—can learn broad lessons from other cases that interpret this right. At the same time, officials in public schools can learn much from the way that nonsecular and religious private schools deal with controversial curriculum matters.

First, officials in nonpublic schools typically involve parents extensively in curricular decisions and engage in ongoing communication about the rationale behind particular subject matter. While readily conceding the myriad of difficulties in doing so, if officials in public schools engaged in the same level of parental dialogue as in nonpublic private schools, there likely would be significantly less conflict over curricular matters. Second, nonpublic schools typically teach controversial subjects in a manner that advances a particular worldview. Although public schools are constrained by the Establishment Clause, local boards need not be neutral in their presentation. In other words, there is broad discretion to engage in "government speech" and say that certain personal choices are better than others. For example, officials in public schools can say that abstinence is preferable to casual, recreational sex. Similarly, in those states where public policy is against such issues as the state recognition of gay marriage, public schools may adopt a message that reflects such policy.

In light of the significant curricular differences between public and nonpublic schools, this two-part article reflects on how educators in both systems can learn from one another as they seek to ensure the presence of diverse educational perspectives in the marketplace of ideas. The first

part of the article examines legal developments on curricular issues surrounding sexuality. The second section offers reflections on how educational leaders can work to maintain the vibrancy of American schools by affording parents the opportunity to send their children to study in schools best meeting their needs. The article rounds out with a brief conclusion.

SEXUALITY EDUCATION IN PUBLIC SCHOOLS

In *Pierce*, the Supreme Court clearly defined the important parental right to direct the upbringing of their children as including the ability to withdraw their offspring from state educational systems and place them in religiously affiliated nonpublic schools. Yet, subsequently, lower federal, and state, courts have sent a different message in this regard once parents permit their children to attend State schools. To this end, four recent federal cases from opposite sides of the nation—two from Massachusetts, one from New Jersey, and one from California—have stood *Pierce* on its ear. Taken together, as reflected in the ensuing discussion, these cases stand for the proposition that parents who send their children to public schools may well have little or no say in issues concerning sexuality education in state schools.

On the general issue of school attendance, the Sixth Circuit noted, “while parents may have a fundamental right to decide *whether* to send their child to a public school, they do not have a fundamental right generally to direct *how* a public school teaches their child[ren]” (*Blau v. Fort Thomas Public School District*, 2005, pp. 395–396). This principle applies equally in religiously affiliated nonpublic schools. Without a doubt, pursuant to the Tenth Amendment and state laws, state and local school officials have broad discretion to set curricular content. Yet legitimate questions can be raised about the extent to which parents should have some voice directing the education of their children. One can also wonder whether parents should be free to have their children excused from courses or other activities that they deem objectionable based on their religious values, regardless of whether their offspring attend public or nonpublic schools.

Brown v. Hot, Sexy, and Safer Productions

In *Brown v. Hot, Sexy and Safer Productions* (1995), parents in Massachusetts unsuccessfully challenged an explicit sex-education/AIDS awareness program for high school students. Despite the fact that a board policy provided parents with notification of such a program, school officials permitted it to proceed without affording parents the opportunity to excuse their children from attending. The parents of two students filed suit on constitutional grounds, alleging that educators violated their privacy rights under the First and Fourteenth Amendments. Citing their students’ substantive due process rights under the First and Fourteenth Amendments, their procedural due process rights under the Fourteenth Amendment, and their First Amendment rights under the Free Exercise Clause, along with a charge of deprivation of their right to direct and control the upbringing of their children, the parents claimed that the program presented sexually explicit monologues and sexually suggestive skits with several minors chosen from the audience (*Brown*, 1995).

As result of the presentation, the plaintiffs filed suit claiming that some students were intimidated and that others mimicked the instructor’s behavior by displaying overtly sexual behavior.

The parent-plaintiffs asserted that the program violated their children's constitutional right to privacy as well as their right to direct and control their children's education. After a federal trial court dismissed the case for failure to state a claim, the plaintiffs sought further review.

On appeal, the First Circuit affirmed that because the actions of school officials did not shock the conscience, the standard necessary for a federal civil rights violation, they could not be liable on this account. Second, and more important, the court held that the sexually explicit program did not violate the rights of the parents to direct their children's education. Interpreting the right recognized by *Pierce* in a narrow fashion, the court observed:

We do not think, however, that this freedom encompasses a fundamental constitutional right to dictate the curriculum at the public school to which they have chosen to send their children. We think it is fundamentally different for the state to say to a parent, "You can't teach your child German or send him to a parochial school," than for the parent to say to the state, "You can't teach my child subjects that are morally offensive to me." The first instance involves the state proscribing parents from educating their children, while the second involves parents prescribing what the state shall teach their children. If all parents had a fundamental constitutional right to dictate individually what the schools teach their children, the schools would be forced to cater a curriculum for each student whose parents had genuine moral disagreements with the school's choice of subject matter. We cannot see that the Constitution imposes such a burden on state educational systems, and accordingly find that the rights of parents as described by *Meyer* and *Pierce* do not encompass a broad-based right to restrict the flow of information in the public schools. (*Brown*, 1995, pp. 533—534; internal citations omitted)

Third, the court simply rejected the students' claim that they had been exposed to "patently offensive language" (*Brown*, 1995, p. 534). To this end, the First Circuit maintained that there were no cases upholding a right to be free from such language and saw no need to expand the law to offer such protection. Fourth, the court decided that the parents could not recover for the failure of the school board and building-level officials to follow the board's policy with regard to notification. The court based its judgment on the rationale that the behavior of the plaintiffs was a "random and unauthorized act" for which the board could not be liable. Fifth, the court held that the parents' constitutional right to the Free Exercise of Religion did not trump the board's curricular choices, as school officials had ultimate authority for regulating educational programming. Finally, the court declared that the children were not entitled to damages for sexual harassment because the plaintiffs failed to prove their claim that the presentation created a sexually hostile environment in the school. In sum, the fact that the parents did not wish their children to view such a sexually explicit program, that the children themselves were offended, and that the content of the program was contrary to the religious views of both parents and children was irrelevant. The court was convinced that the state's right to determine curriculum trumped the parental issues at bar.

Fields v. Palmdale School District

In *Fields v. Palmdale School District* (2005), parents in California challenged a school board's practice of permitting educators to distribute a sexually explicit survey to children in the first, third, and fifth grade. Among the sexually explicit questions were those that sought children's attitudes about: "8. Touching my private parts too much; 17. Thinking about having sex; 22.

Thinking about touching other people's private parts; 23. Thinking about sex when I don't want to; 26. Washing myself because I feel dirty on the inside; 44. Having sex feelings in my body; 47. Can't stop thinking about sex" (p. 1202, note 3).

Unhappy parents unsuccessfully filed suit in a federal trial court in California claiming that school officials violated their rights both to privacy and by introducing matters to their children both to and about sex. After the trial court dismissed the parents' suit for failure to state a claim (*Fields v. Palmdale School District*, 2003) they sought further review.

On appeal, the Ninth Circuit rejected the idea that *Pierce* and its progeny allowed parents to object to specific aspects of the state's school curriculum. Relying specifically on *Brown*, the court wrote,

Parents have a right to inform their children when and as they wish on the subject of sex; they have no constitutional right, however, to prevent a public school from providing its students with whatever information it wishes to provide, sexual or otherwise, when and as the school determines that it is appropriate to do so . . .

Although the parents are legitimately concerned with the subject of sexuality, there is no constitutional reason to distinguish that concern from any of the countless moral, religious, or philosophical objections that parents might have to other decisions of the School District—whether those objections regard information concerning guns, violence, the military, gay marriage, racial equality, slavery, the dissection of animals, or the teaching of scientifically-validated theories of the origins of life. Schools cannot be expected to accommodate the personal, moral, or religious concerns of every parent. Such an obligation would not only contravene the educational mission of the public schools, but also would be impossible to satisfy. (*Fields*, 2005, p. 1206)

In other words, the court was of the opinion that "once parents make the choice as to which school their children will attend, their fundamental right to control the education of their children is, at the least, substantially diminished" (p. 1206). Thus, the court concluded that the right of parents to direct the education of their children, as originally identified in *Pierce*, "does not extend beyond the threshold of the school door" (p. 1207).

In an interesting side note, on November 16, 2005, 2 weeks to the day after the Ninth Circuit rendered its judgment in *Palmdale*, the United States House of Representatives condemned the court's ruling. Acting on a resolution introduced by Representative Tim Murphy (Republican-Pennsylvania), the United States House of Representatives "voted 320–91 for a resolution that said the decision by the 9th U.S. Circuit Court of Appeals 'deplorably infringed on parental rights'" ("House Scolds," 2005). Of course, this gesture was of no legal impact and left the ruling in place.

C.N. v. Ridgewood Board of Education

In *C.N. v. Ridgewood Board of Education* (2005), which was resolved a month after *Fields*, three New Jersey students and their mothers challenged their school board's voluntary anonymous survey of children. The suit claimed that the surveys violated students' rights under the two expansive federal statutes—the Family and Educational Rights Privacy Act (2006) and the Protection of Pupil Rights Amendment (2006)—and various provisions of the Federal Constitution. The federal trial court ruled in favor of the school board (*C.N. v. Ridgewood Board of Education*,

2001). On appeal, the Third Circuit affirmed in part and reversed in part *C.N. v. Ridgewood Board of Education* (2002). On remand, the trial court again ruled in favor of the board (*C.N. v. Ridgewood Board of Education*, 2003).

On the second appeal, the Third Circuit affirmed the decision in all respects (*C.N. v. Ridgewood Board of Education*, 2005). First, the court held that despite the personal nature of the questions, school officials simply did not violate the right to privacy of the students or their parents. Second, the court found that answering the survey questions did not constitute compelled speech, meaning that officials did not violate the rights of students by forcing them to reveal particular information about themselves. Finally, and most important for purposes of this article, the court thought that school officials did not violate the parents' right to direct the education of their children. As the court noted, "Courts have held that in certain circumstances the parental right to control the upbringing of a child must give way to a school's ability to control curriculum and the school environment" (pp. 182–183; internal citations omitted). Thus, although the court recognized the importance of *Pierce*, it determined that "the decision whether to permit a middle or high school student to participate in a survey of this type is not a matter of comparable gravity" (p. 195).

The Third Circuit's narrow interpretation of *Pierce* notwithstanding, it emphasized that its view of *Pierce* was far more expansive than the Ninth Circuit's might have been. Commenting on *Fields*, the court declared,

we do not hold, as did the panel in *Fields v. Palmdale School District*, that the right of parents under the *Meyer-Pierce* rubric "does not extend beyond the threshold of the school door." . . . Instead, guided by *Gruenke [v. Seip, (2000)]*, wherein this Court stressed that it is primarily the parents' right "to inculcate moral standards, religious beliefs and elements of good citizenship," [at 307] we determined only that, on the facts presented, the parental decisions alleged to have been usurped by the School Defendants are not of comparable gravity to those protected under existing Supreme Court precedent. (*C.N.*, 2005 p. 185, note 26)

In other words, rather than create a clear test in a manner similar to the way in which the Ninth Circuit attempted to, the Third Circuit sought to engage in a form of judicial balancing. In this regard, of course, any judicial balancing test involves "malleable standards" that are easily transformed into "vehicles for the implementation of individual judges' policy preferences" (*Tennessee v. Lane*, 2004, p. 556). In other words, an outcome may become dependent not on legal principles but on the whim of a court majority. Of course, an argument can be made that whether there was a constitutional violation would depend on the individual circumstances. Indeed, if confronted with the sexually explicit program at issue in *Fields*, the Third Circuit may well have reached the opposite result.

Parker v. Hurley

Parker v. Hurley (2008a, 2008b) focused on instruction about same-sex marriage in a K-12 setting (Russo, 2008). In *Parker*, the parents of kindergarten and second grade students challenged school officials who refused to follow a Massachusetts General Law Annotated (1996) statute directing educators to provide parents with notice and an opportunity to excuse their children from instruction on sex education or human sexuality that conflicts with familial religious beliefs. The curriculum at issue relied on materials that "portray[ed] diverse families, including families in which both

parents are of the same-sex gender" (p. 90). When the first child was in kindergarten, his teachers read *Diversity Book Bag* and *Who's in a Family*, materials, which present families of different backgrounds, including single-parent families, interracial families, families without children, families with two fathers, and families with two mothers. In second grade this same child was exposed to *Molly's Family*, a book in which a girl was embarrassed because she had a mommy and a mama. Second-grade classes read *King & King*, the story of two princes who fall in love and marry; the story ends with the princes kissing, but the depiction superimposes a heart over their mouths.

As the dispute progressed, the father of the kindergarten child was arrested for refusing to leave school after demanding that officials notify him before any discussion of homosexuality was presented to his son's class; the trespassing charges he faced were later dropped ("Dad Dodges," 2005). About a year later, the mother of a different second grader complained that "by presenting this kind of issue at such a young age, they're trying to indoctrinate our children. They're intentionally presenting this as a norm, and it's not a value that our family supports" (Tracy, 2006).

The parents unsuccessfully filed suit in the federal trial court in Massachusetts (*Parker v. Hurley*, 2006). The court rejected the parental claims that officials violated their rights to privacy and substantive due process in the upbringing of their children by exposing them to same-sex marriage at too young an age. The court also rejected the parents' claim that school officials violated their children's First Amendment right to the free exercise of religion by not notifying parents and allowing them to remove their children from instruction involving the disputed books pursuant to commonwealth law.

On further review, the First Circuit affirmed a grant of summary judgment in favor of the school committee and various officials. The court ruled that officials did not significantly limit either the plaintiffs' parental rights to due process or free exercise of religion. The court thought that officials acted within the bounds of their authority in having teachers use books that portrayed diverse families, including ones in which both parents were of the same gender.

REFLECTIONS FOR PUBLIC AND NONPUBLIC SCHOOLS

Litigation discussing the interplay between the government's discretion to set curricula over controversial topics such as sexuality education and the long-recognized but seemingly eroding parental right to direct the upbringing of children offer important lessons for officials in both public and nonpublic schools. The following section of the article offers suggestions for educational leaders, regardless of whether they are in public or nonpublic schools, to consider when introducing controversial curricular topics for students.

First, parents care deeply about both the content and method of instruction. Because parents are responsible for the well-being of their children, especially during their tender years, there can be no doubt that they possess the right to intervene on behalf of their children, a fact that is supported by the *Palmdale* situation. This parental right should be especially clear in light of reasonable concerns that their children are being exposed to inappropriate material at a point in their lives when parents may wish to address such controversial topics with their young in the privacy of their homes. Educators need to be honest and recognize that when dealing with issues of sexuality and accompanying curricular materials, particularly about same-sex relationships, public schools might wish to follow the lead of their colleagues in nonpublic schools and seek greater input in

devising policies and/or curricula in which parents have at least had the opportunity for some input (Wardle, 2011).

To this end, it is disingenuous at best, deceitful at worst, to claim that teaching about issues in sexuality, a matter typically left to parents, are value free. Indeed, those parents who have made an explicit choice to send their children to religiously affiliated nonpublic schools due to their own religious beliefs are more likely to be passionate about curricular issues than their peers who have sent their children to public schools (Yang & Kayaardi, 2004). If anything, the subject matter of such gay-friendly books as were at issue in *Parker* is every bit as value-laden as teaching about religion in public schools. Clearly, debates over sexuality are not so much about challenges to the teaching of values as it is over whose values should prevail, those of parents or activist groups. Moreover, an argument can be made that the use of curricular materials promoting a particular point of view are truly insidious because they seek to exert subtle influences over unsuspecting children, often without parental knowledge or consent, while purportedly acting under the guise of teaching about diversity and openness, a direct violation of the principle enunciated in *Pierce* and that has led many parents to send their children to religious schools or engage in home schooling.

In light of the sensitive and controversial issues involved in *Brown*, *Fields*, *C.N.*, and *Parker*, an argument can be made that these cases have taken a position that is in stark opposition to *Pierce*. As reflected by the Congressional furor over *Fields*, in particular, the challenge for educational leaders, regardless of whether they are in public or nonpublic schools, is to reconcile the two divergent visions of the relationships between and among parents and educators.

Second, when parents disagree with school officials' decisions of what is taught, how it is taught, and who is teaching it, there can be significant conflict, and these conflicts can be harmful. Disputes over curriculum can divide school communities and, potentially, the schools' governing boards. Although disputes over curriculum in nonpublic schools are less likely to be subject to secular court litigation, especially if they are over religious content, the absence of suits does not reduce the intensity of the feelings or the potential for long-term harm.

If educators are unable to set a middle ground with regard to curricular concerns by seeking greater parental input, then they run the risk of existing in a perpetual state of conflict with parents. More specifically, educators must consider whether their task is essentially to supplant parents with regard to directing the education of their children, especially when dealing with such highly sensitive materials as human sexuality. Educators must consider whether they wish to give a radical new meaning to the concept of *in loco parentis*, whereby they are supposed to act "in the place of the parent" with regard to discipline and control of school children, or whether they are obligated to work collaboratively with parents in educating children as suggested by *Pierce*.

Third, before developing and implementing programs that deal with subject matter as sensitive, controversial, and potentially divisive as human sexuality in K-12 settings in as explicit and public a manner as in *Brown*, *Fields*, *C.N.*, and *Parker*, educators, whether in public or religiously affiliated nonpublic schools, should at the very least engage in some form of consultation with parents, whether individually or through parent-teacher-type organizations. This article certainly does not wish to grant parents a "heckler's veto" (*Elk Grove Unified School Dist. v. Newdow*, 2004, p. 32) over the decisions that educators make with regard to controversial curricular materials. Even so, educators would be wise to collaborate with parents to consider their points of view. As important a topic as sexuality education is, one wonders how much school systems can accomplish

if officials ignore legitimate parental concerns in cases such as the ones discussed herein and act on their own volition. At the risk of oversimplifying, controversies such as those in *Brown*, *Fields*, *C.N.*, and *Parker* cannot help to advance the legitimate educational concerns of either parents or school officials and can only lead to unnecessary, and typically costly, strife that often culminates in litigation in which both sides ultimately lose no matter who prevails in court.

Fourth, if educators proceed with questionnaires such as in *Fields* and *C.N.*, programs, or curricula that are as sexually explicit as in *Brown* and *Parker*, respectively, then they should develop materials that are age appropriate. Even conceding that some of the questions may have been acceptable for adolescents in *Palmdale* and *C.N.*, others in both cases appear to be inappropriate for students of any age and run the risk of causing more harm than good, especially if they lead to misperceptions about sexuality in the minds of young, impressionable students. Moreover, because some of the questions raise fears about human sexuality, and others may cause different worries, one can only wonder what impact they may have had on impressionable young minds. Put another way, considering that many students, especially those in first grade, may not have understood some of the questions about human sexuality as in *Palmdale*, or the content of the books in *Parker*, then it would seem to be prudent to address the material in a way that young children can grasp and in a fashion that respects parental concerns. At the risk of appearing overly simplistic, just as in instruction in such topics as mathematics and reading progress according to logical, sequential developmental steps, it seems that educators would be wise to adopt a similar approach with a topic as controversial as sexuality for children.

Fifth, educators should comply with existing opt-out provisions in state law and board policies. Alternatively, if boards do not have such policies in place, educators should consider developing them to permit parents or students to opt out of certain situations based on religious, philosophical, or even pedagogical grounds. In fact, opt-out plans might also offer alternative programs that may be able to cover the same material in a less controversial format. Again, although fully acknowledging the authority of educational officials to direct the content of school curricula, regardless of whether they are in public or non-public schools, and not wishing to see them yield too easily to parental pressures, such an approach is worth considering, especially because it can help to eliminate conflict with parents by working with them and taking their legitimate concerns into consideration. Moreover, by demonstrating a willingness to work with parents on controversial issues, educators can establish more open lines of communication that will benefit entire school communities (Epstein, 2011)

Sixth, educators and their lawyers should review their policies annually, typically between school years, not during or immediately after controversies. Placing time between controversies and modifying policies will afford school districts, as well as parents, better perspectives. The value in reviewing policies regularly is that, in the event of litigation, evidence of doing so can help to convince courts that educators are doing their best to be up-to-date in safeguarding the rights of all school communities in the face of rapid changes in the world.

CONCLUSION

Regardless of whether children attend public or nonpublic schools, a clear tension exists between the rights of parents to direct the upbringing of their children and the ability of educational

officials to define, direct, and implement curricula. For the public schools, this tension is often resolved through federal court litigation. Nonpublic schools, on the other hand, are able to avoid secular litigation. Despite the end results, however, this tension raises the real possibility of lengthy conflicts that can grievously divide school communities and lead to parents withdrawing their children from schools, in the process casting doubts on those same schools' long-term viability. Although the constitutional, contractual, and ecclesiastical constraints differ substantially, officials in both public and nonpublic schools may learn from each other's experiences.

Educators in both the public and nonpublic sphere must recognize the need for parental input into curricular content. The more that school officials treat parents as partners, rather than as adversaries, the more successful administrators and teachers will be in providing high-quality, age- and content-appropriate education for all of their students.

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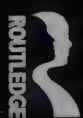
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September 2012

Introduction

Jennifer DeBoer

Massachusetts Institute of Technology

■ Madeline Mavrogordato

Peabody College of Vanderbilt University

As a large, diverse country, the United States has long struggled with the inherent complexity of its federal system. Over time, public policy has grown ever more centralized to better address the complex needs of the United States's various people. This has created a policy environment rife with interest groups and power struggles. Some of the key battles of historical policy development have been over whether or not the national government, states, and community leaders have the right to dictate how services are provided to constituents. Currently, there are few more convoluted and disputed issues than education policy.

DEFINITIONS

Centralization (and decentralization) can take many forms. For example, political centralization refers to the centralization of the locus of decision making, whereas administrative centralization refers to the centralization of the responsibility for service provision (World Bank, 2011). In this issue of the *Peabody Journal of Education*, we interpret centralization as meaning higher levels of governance within the hierarchy of the American government—the highest being the federal government and the most local being the school level.

THE TENSION IN AMERICAN EDUCATION POLICY TODAY

Much of the raucous debate on American education epitomizes the push and pull that permeates U.S. politics—powers reserved to local (or often state) authorities vie for relevance against a unified national policy environment. The policy dialogue and recent trends indicate that the federal level of education policymaking is taking a stronger and stronger hand. This conflict even seems to cross party lines. Both conservative and liberal policymakers support centralized authorities, with conservative policymakers supporting national accountability and liberal pundits supporting national teachers' unions.

Although some may claim an obvious trend toward more centralization, this issue demands a closer look—is this really the case? At the same time as policymakers have begun to encourage national standards, there has been a parallel bipartisan push for localized solutions to education problems, such as charter schools. And while the national teachers' unions wield noticeable political clout, liberal researchers and policymakers still resist the standardization and professionalization of teaching credentials outside of traditional teachers' college institutions.

This issue of the *Peabody Journal of Education* looks at the topic of national centralization of American education policies from a variety of perspectives, illuminating this complex issue on numerous facets. Whether through the lens of school finance, laws governing English language learners, or a discussion of other trends toward more centralized decision making, we see that centralization exists but does not follow a direct path. What emerges is a picture of a nation in a state of perpetual agitation. Despite this, the United States has undergone perhaps less structural change than the dialogue might belie. The following collection of articles focuses on specific issues that illuminate this tension, the process of centralization, and overall implications.

THIS ISSUE

First, Jennifer DeBoer (Massachusetts Institute of Technology) provides an international context for the American situation. Policymakers in the United States often look to other countries as sources of inspiration, as metrics by which to evaluate the American standing internationally and as threatening competitors in the global marketplace. As the United States moves along the centralization spectrum, its relationship to the global education market changes as well.

Following this, John E. Haubenreich (Peabody College of Vanderbilt University) looks at the foundation of the United States and the discussion of national education policy at the time. The Constitution does not explicitly mention a national education policy, but the founders clearly valued education as a support for an informed, civically engaged democratic population. This article explores early debates in national education politics and how education policy has evolved in the judicial system.

Judicial contests permeate the history of the next article, our first policy example, which focuses on national policies toward bilingual education. Madeline Mavrogordato (Peabody College of Vanderbilt University) outlines the recent history of subnational and national policy for English language learners, including the judicial and legislative policies that have shaped the national dialogue in the last half century. A pressing topic for today's politics in general, bilingual education offers a relevant example of the trend towards centralization in American education policy.

Coby Meyers (American Institutes for Research) focuses on the unifying language used in education policy for primary and secondary schools today. Terms like "achievement gap" and "No Child Left Behind" (NCLB) were developed over the last 50 years of education policymaking and have become common within the educational vernacular. The spread of their use and the standardization of their implications illustrate how educational dialogue is increasingly driven from a central, often national, power, with states and local authorities moving their individual interpretations closer to these national targets.

One way that NCLB attempts to alleviate the achievement gap is by ensuring high-quality teachers populate all classrooms, especially those that are traditionally underserved. However, defining, training, and evaluating a "high-quality teacher" is a complex and highly debated topic,

as seen in our second specific policy example—teacher certification. Kerri Tobin (Marywood University) discusses the teacher certification process, the diverse and warring stakeholders involved in certification, and the ways in which the procedures used by American institutions to credential primary and secondary school teachers have changed.

The penultimate article provides not only a third example of more centralized policy but also an important perspective for members of the education research community. Chad Lykins (University of Hong Kong) discusses the role of social science research policy in creating the education research agenda, focusing on the practical role and philosophical mission of policymakers at the national level and then discussing the specific goals and structures that should be in place for quality education research.

The editors finish the issue with their concluding remarks. In these remarks, the editors cannot (and do not attempt to) give a definitive yes or no answer to the question laid out at the beginning of the issue. Instead, the final article highlights the common threads that bind together each respective policy example, noting the importance of political rhetoric, philosophy, history, and organizational context in deciphering the overall trend of education policy in the country. The issue then concludes by looking ahead to potential suggestions for how the trend toward centralization might shape educational policies in the future.

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Twentieth-Century American Education Reform in the Global Context

Jennifer DeBoer

Massachusetts Institute of Technology

As detailed in the articles throughout this issue, the U.S. education system experienced a number of structural developments throughout the 20th century. These changes served to shift the landscape of decision-making authority in multiple areas of primary and secondary schooling. This article provides an international perspective on the changes undergone by the American system, painting a broad picture of where the trends in the United States' educational system fit within changes worldwide. To best understand the possible implications of changes in the United States, I describe trends in educational centralization and decentralization in other nations, placing the American changes in a broader context shedding light on where education in the United States could be headed.

MOTIVATION

In areas as diverse as language policy and education research philosophy, the trajectory of American education during the 20th century can be seen as a move from a more decentralized system to a more centralized system. Given the complex interaction between the federal, state, and local levels in American education, this trajectory can be specifically characterized as a shift from cooperative decentralization to competitive centralization; independent local actors who worked in loose connection in the past have now been brought together in a tug-of-war for authority. The characteristics of centralized governance have become noticeably stronger in a number of sectors over the course of the 20th century. Despite numerous cycles of wax and wane, the system continues to “tinker towards utopia” (if centralization is the ideal) by inching toward more nationally standardized and regulated systems (Tyack & Cuban, 1995).

To better understand the nature of the American reforms and the country's current situation, it is necessary to place this process in a broader context. This article compares and contrasts education systems in other nations with trends in centralization/decentralization to situate an understanding of the American structure within an international perspective.

RESEARCH QUESTIONS

This article asks the following question: Given the observed reforms in the American education system during the 20th century, where can we place this development in the international context? A number of subquestions further hone the inquiry.

- *First, how can we characterize this centralizing tendency in the United States and where else can we observe a similar overall pattern of development?* The tendency, as I describe overall and as other authors in this issue illustrate with specific examples, includes an increased centralization of numerous loci of decision making. Alongside these particular areas of centralization, an opposing reaction manifests itself as a simultaneous growth in local authority for other specific areas.
- *Second, can we observe countries that are experiencing the opposite tendency?* I contrast selected national education systems with the American case. Illustrative examples show a push toward greater decentralization of control. However, as in the American case, there is an opposing push against the shift in power as well.
- *Third, what does the overall continuum of system structures look like?* Are there relevant examples of countries already at one or the other end of the centralization spectrum? These benchmarks help to explain where America fits in the broad scope of educational governance systems.
- *Finally, what does the process of centralization/decentralization look like?* What are the steps and actors, inputs and outputs? What does the trend of the 20th century imply for the future of American educational governance?

OUTLINE

With a number of questions to motivate this article, I begin by establishing what centralization/decentralization means for this inquiry. I then look at how centralization manifests itself in different countries. I draw comparisons to the American trajectory and provide counterexamples. I provide illustrations of countries that are traditionally centralized or decentralized in their educational policies (a structure often mirrored in other sectors of governance) to serve as a kind of baseline for descriptions.

Simply describing a system as “more centralized” than another system, however, is an oversimplification. I thus proceed to break down the components of the process in order to fully explain the process of determining the level of decision-making power. I then look at causes of different centralization and decentralization plans, how these reforms were implemented, and what outcomes were observed in myriad contexts.

Finally, I provide examples of how decisions are centralized or decentralized in regard to specific subjects in educational governance, including topics discussed in the rest of the issue. Altogether, these case studies, dissections of governing processes, and international comparisons allow educators in the United States to better understand the global context in which American reforms are happening.

DEFINITIONS

To begin, I briefly establish definitions of the terms *centralization* and *decentralization*. Centralization, in general, can be taken to mean the movement of decision making to a more concentrated authority (i.e., district to regional, state to national level, or any more consolidated level). Decentralization broadly means the opposite action. As examples from around the world show in this article, centralization and decentralization are processes that can often coexist (Bray, 1999). This is made possible by the wide variety of subjects or components of policies on which decisions must be made, even specifically in education.

Decentralization (and its converse, centralization) can take on a number of configurations. Bray (1999) described the processes of *deconcentration*, whereby central agencies install field offices with their own employees; *delegation*, whereby some decision-making tasks are transferred to local organizations; or *devolution*, whereby powers are formally held at subnational levels. Assigning these labels to different kinds of decentralization in practice, however, may prove difficult (Conyers, 1986). As I examine a multitude of diverse contexts, it becomes even more clear that decentralization is a difficult concept to fully characterize. For the purposes of this article, it is more useful to look at individual reforms and the degree to which they consolidate responsibility or disperse it overall. I touch on all three types of (de)centralization just described as I describe structures in different countries.

As illustrated by the complex definitions given, the actual nature of centralization/decentralization is not as easily described or quantified as it might initially seem. Some sectors may be easily modified to be more locally controlled, whereas other sectors may be chosen as necessary for national oversight. These trends may exist contemporaneously, or policy may completely shift toward centralization or decentralization. The discussion of de/centralization in education policy is multifaceted and contentious. I provide an international macroperspective here to situate the complexities of the American system.

COMPARISONS TO THE UNITED STATES

To best understand how the American transition fits into the international context, I look first at the question: Who else is simultaneously undergoing a process parallel to that occurring in the United States during the 20th century? As demonstrated in the other articles in this issue, the American context, in various areas of educational policy, has begun to allot more oversight and implicit or explicit power to national policymakers. Other countries are experiencing similar transitions to a more solidified hierarchy, mirroring American developments to varying degrees. Although it would be extremely useful to look at other nations' trajectories over the course of the entire 20th century, there is insufficient space for that discussion here. Instead, I focus on more recent developments that parallel America's history and occasionally reference the broader background of a country's decisions.

What Is the Case in the United States Overall?

Generally speaking, America's overall development could be characterized as a move toward a more centralized structure; although certain tasks are still diffused to the local level,

there has been increased standardization across the nation and greater connection to national-level policy. Perhaps it could be better explained as greater hierarchical solidification of responsibilities—differentiated authority to federal, state, and local bodies that are increasingly interconnected.

In some ways, this is a peculiar American challenge. It could be described as an increase in “federalization.” The current push for American education (as exemplified in the turn-of-the-century No Child Left Behind [NCLB] policy) could be characterized as such: Greater centralized accountability (Title I funding) is coupled with more localized decision making (e.g., charter schools). In a country that cobbles together a diverse, historically distinct group of local governments, even a trend toward centralization comes with an increase in some decentralized policies.

There are other examples of increasing centralization mixed with allowances for local decision making in the international context. In some cases, mixed centralization means accountability at one level and decision making at another. In others, it means different tasks are allocated to different levels of governance.

The Anglo-American Model

England

England provides a valuable corollary to the 20th-century American reform movement, as the country is currently undergoing a process similar to that which is occurring in the United States. England’s developments have frequently echoed changes in the United States over the last 25 years. The NCLB legislation can be compared with England’s contemporary mix of centralized and decentralized policies. Pushes for accountability and sweeping education reforms came under Margaret Thatcher’s “New Right” in the latter years of the 20th century. Greater parental choice in schools came along with the creation of a teacher education accreditation body at the national level. Local education authorities saw a number of their large powers threatened, including the 1988 establishment of a national curriculum. Reagan and Thatcher themselves have also been frequently compared. Many of Thatcher’s policies, although instituting some localized components, did so under the authority of national control, and were highly centralizing (Davies & Guppy, 1997).

In fact, Davies and Guppy (1997) pointed out that numerous countries in the Anglo-American tradition have mirrored each other’s educational reforms in recent years. The shared cultural and political histories of these countries help in understanding the developments, possible futures, and potential pitfalls that might be faced as the United States follows this path. Similar political environments favoring neoliberal education governance may help to catalyze comparable developments internationally.

Australia and New Zealand

Beyond England and the United States, other nations with a British heritage have followed suit. Australia has recently undergone a shift to a centralized accountability model. Teese (1988)

described how Australia's shift occurred concurrent to the relevant shift in England and the United States. The shift in Australia, beginning around the same time, seems to have taken hold more quickly and more firmly; by the early 1990s, authors point out that even higher education had been subject to "coercive federalism" (Smart, 1991).

New Zealand, like its larger neighbor, has exhibited similar tendencies to those occurring throughout the Anglo-American education world. The country's movement toward strong school-based management has been the result of two extensive policy papers and what might be "the most thorough and rapid structural reform project ever undertaken by a developed country" (Fiske, 1996, p. 16). Beginning in May 1989, a series of reforms led to the elimination of the regional level of bureaucracy and the transfer of authority for budgeting, staffing, and other logistical education decisions to school authorities. On the other hand, funding still comes in bulk on a per-pupil basis from the national government.

New Zealand's reforms parallel some of the tendencies in the United States in that some components of the education system have moved to national oversight, whereas others have shifted to the school level. A national curriculum, for example, exists alongside school-based management structures. In addition to school-based management, localized school choice mechanisms allow families to choose the schools that "best" meet their needs. The localization of some authority, however, may not have benefited all Australians; some point out that "local states of emergency" have cropped up, where Maori families have become even more overrepresented in underperforming and underresourced schools (Robertson & Dale, 2002). This has implies important cautions for the education of minority populations within the United States as comparable reforms unfold.

Elsewhere

Instances of mixed centralization/decentralization in recent years can also be found outside of OECD Anglo-American governments. Uganda typifies this dual development. Many public services have been decentralized since independence, though the resources that are given through local offices still come from the national central ministry. The sustainability of decentralized institutions rests in part on the perceived accountability of newfound authorities, as the Uganda example illustrates. In Uganda (Suzuki, 2002), parental participation at the very local level was seen as a necessary support for the sustained local structure of education.

Further examples of mixed centralization come from southern Africa. Zambia's administrative reform in 1980 gave increased authority to district councils, but added representatives of the national party to these councils (Conyers, 1986). Malawi's governance structure prior to independence also illustrates how centralized policies can be mixed or cooperative. The British government created a system whereby it would provide the funds to sustain primary schools. Local communities, however, had to come up with the resources to build the physical school buildings.

What Do These Comparisons Mean for the U.S. Context?

All of the models listed as comparable to the U.S. situation have some historical affiliation with the British colonial rule. Whether as older, higher income Anglophone countries or lower income countries with more recent histories of colonial oppression, nations with former political ties to the

British may retain an important regard for educational decentralization, even as they centralize some components of education governance. Comparisons between and within the examples provided here underscore the mixed nature of the centralization movement. They also illustrate that countries with different demographic profiles from the United States are still experiencing parallel centralization processes.

CONTRASTS TO THE UNITED STATES

There are many examples to compare with the American structure, but contrasting cases are also useful to better understand the broader context of the changes to the American education structure. I provide examples of cases where development—educational reforms in the dimension of centralization—are moving in the opposite direction of the United States. Although the overall direction of the changes in the American system could be said to be more toward centralization, the balance in many other countries is, in fact, the opposite.

Van Amelsvoort, Scheerens, and Branderhorst (1995) looked at the Dutch system compared to a handful of other Western European countries. In general, the tendency in the Netherlands, the Flemish region of Belgium, Portugal, Sweden, and two regions of Germany has been toward decentralization and deregulation. In all of these locales, structures at higher, more centralized levels of policymaking already exist. These countries and many others, including nations outside of high-income Western Europe, are focusing on decentralizing governance rather than consolidating it.

There are a host of examples of countries moving opposite the American trend, toward more decentralized educational policy over the course of the 20th century. I provide a number of additional examples in subsequent sections, but I turn now to examples of the “most” centralized and decentralized national education systems.

CALIBRATION WITH THE ENDS OF THE SPECTRUM

To provide a relevant baseline for this discussion, I look at some of the countries that have been and are currently highly centralized. On the opposite end of the spectrum, a number of countries have always tended toward more decentralized policies. Both of these ends of the spectrum illustrate the practical range of structures in contemporary education policy, the “real extremes.” The “true” ends of the continuum are unrealistic (Conyers, 1986); a completely centralized or decentralized system does not exist in practice. But who is on either end of the spectrum? Who is in the middle? What tendencies can be observed in the characteristics of countries at either end?

“Highly Centralized”

France has traditionally been classified as a highly centralized country and is often the prototypical example of educational centralization (e.g., Bleich, 1998). Despite recent attempts to decentralize certain components of curricular governance to respond to local problems, the Ministry of Education has maintained tight control over the set national curricular frameworks. Part of the impetus for this comes from the traditional mandate of the government to ensure free and equal

public education for all. Only such decisions as school-day hours, extracurricular activities, and equipment supplies are allocated to the regional level. Even private schools, which often receive national government funding, must comply with the national curriculum if they want to continue their contracts. As a result of European pressure, France has made small allowances for local languages to be taught in primary schools. However, even this localized practice may serve to further marginalize indigenous languages and enforce nationalism (DeBoer, 2011).

Denmark's structure is similar to France's centralized education authority, though its demographics are notably distinct. In fact, its smaller size and relatively homogenous population would seem to fit even more logically into the portrait of a centralized country. However, although size may be one of the factors that is sometimes associated with the creation or sustenance of a centralized or decentralized model, it does not solely predict it; in the case of China, many of the country's education practices are traditionally tightly centralized despite its large geographic size and population. And, although Brazil has become more decentralized as it has transitioned from a military state to a dynamic democracy, the main legislation governing schooling still comes from the central "Law of National Education" (Camilo, 1993).

Data from the Programme for International Student Assessment illustrate the highly centralized nature of Japan and Korea as further examples of the centralized end of the education governance spectrum. Although geographic proximity may be related to some policy borrowing (DeBoer, 2010), regional factors do not always predict how centralized an education system may be. In contrast to Japan and Korea, Hong Kong's education governance is more school driven (Ho, 2006).

"Highly Decentralized"

India's rich cultural diversity—numerous languages, religions, and traditions between its politically strong and diverse states—has been associated with *de facto* differences in subnational decision making. Although politics and many parts of governance are decentralized to the state level in India, some components of highly centralized governance have existed in the country for a long time.

On the international spectrum of education governance, the United States is often cited as one of the most decentralized traditions—this tendency is important to remember in the discussion of America's trend over the last century.

This observation helps to explain the fact that, although the United States and some of its counterparts are working to centralize some components of education governance, many countries in the world are working in the opposite direction. The fact that the United States is moving in the opposite direction from many other countries may be due in large part merely to the fact that these contrasting national systems are historically at opposite ends of the spectrum. Categorizing any given country is difficult. Even looking at centralization within four different dimensions is helpful, but still a generalization.

Graphical Representation

As an additional attempt to organize an ambiguous picture of centralization around the world, I identify a small number of characteristics that distinguish the nations cited here and space them

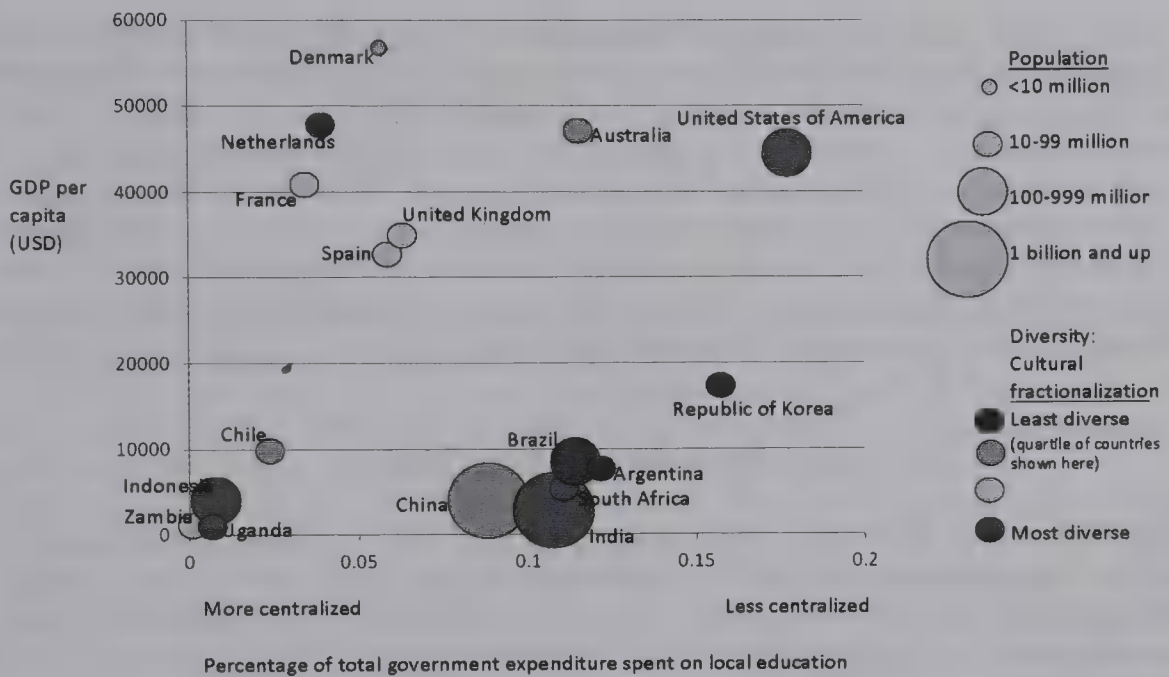


FIGURE 1 Fiscal educational decentralization and income, population, and diversity (color art available online)

out visually. The examples given in this article can be separated by income level, size, diversity, and level of centralization. There are, of course, many additional dimensions around which countries can be grouped, and the picture here is quite generalized. This is a crude metric, and I provide it just as an additional support for understanding broadly where the United States fits.

Fiscal data are taken from the World Bank public sector indicators on decentralization, specifically the International Monetary Fund's Government Finance Statistics. Gross domestic product per capita is taken from the United Nations Statistics Division, with data from 2009. Population data are taken from the United Nations Population Division, and Cultural Fractionalization measures are taken from Fearon (2003). (See Figure 1.)

Diversity is often given as a possible explanation for why certain countries may adopt more decentralized policies, but a comparison of England and France after World War II illustrates the complexity of this issue. Both countries experienced similar influxes of immigrants, but they adopted multicultural education policies in very different ways. Bleich (1998) argued that this is due to the already existing decentralized education structure in both countries. Policymakers in the United States would benefit from a deeper understanding of the history of education decentralization, beyond acknowledgement of the philosophical underpinnings of the education structure.

CAVEAT—LOOKING DEEPER

Throughout the past century of education reform in the United States, more accountability and incentives have come from the center, but local education authorities have maintained some local control. The push and pull between concentrated and diffuse power is a dynamic system. It may be tempting to characterize a country's development as more centralized or more decentralized, but in many cases, this is not wholly true. Even a broad generalization of the centralized character

of an education system is just that—a generalization. The articles in this issue describe the complexities of centralization in the American system. The relationship between centralization and decentralization is difficult to quantify. As illustrated by Figure 1, it is difficult to compare between two nations or even to fully quantify all the dimensions of a single context.

Centralization and decentralization are processes (Conyers, 1986); they are relative terms. Attempts at generalization and one-time answers to research questions run the risk of oversimplifying a complex progression. With this caution in mind, I now discuss different points in the process of shifting the locus of governance in education, breaking down the centralization/decentralization process in a number of examples from around the world.

THE PROCESS—INITIAL CAUSES

First, I lay out some of the factors that could be related to a historical explanation for a country's traditionally centralized or decentralized position or to a country's decision to move forward with education governance reforms. A number of factors may be related to the causes or motivations for policymakers to create a more centralized or more decentralized education system (McGinn & Street, 1986).

Further, processes can be differentiated by where the change is initiated. Is this reform a bottom-up (movement coming from local communities) or a top-down (volition of higher level policymakers) approach? From which level does the impetus for change come (Conyers, 1986)? I look at whether the shift in policymaking comes from one government body letting go of certain responsibilities or from a government body taking on the powers of another.

I provide broad categories for types of motivating factors for centralization/decentralization, and I supplement these categories with specific cases illustrating recent national developments. Examples of causes and motivations in different situations will help understand why a highly centralized power would want to disperse authority (McGinn & Street, 1986). Or, in contrast, they will help explain why a local authority would want to take on additional responsibilities.

Political Motivation

Political motives can push policymakers to argue for more or less decentralization—for example, local politicians wanting to tailor local schools to their communities' specific preferences could form a coalition to push for more localized financial decision making. Political motives for changing the system could be similar to American motivations—factors such as a changing political climate and populace (e.g., *Brown v. Board*), calls for strengthening national competitiveness (e.g., *A Nation at Risk*), and shifting ideological beliefs about the role of public education (e.g., the national standards movement). Or, motives could address issues that are not as present in the U.S. context such as attitudes toward former colonial powers or civil unrest. Similar reforms can even be initiated under different political parties (Davies & Guppy, 1997). This possibility is keenly observed in recent reforms in the United States (e.g., NCLB arising from the work of a Democratic administration and implemented under a Republican president).

Cultural motives can also spur policymakers to agitate for centralized or decentralized actions. For example, Spain decentralized some of its education governance to accommodate different ethnic/linguistic groups. Its policies addressed cultural differences that could have caused political

unrest. In a multicultural context such as the United States, allowing for some decentralization to remain may be important to the diverse communities served by the public education system.

Outside Pressure

Fads

Despite differences in contexts, there are examples of countries undergoing parallel developments in educational governance. One argument points to globalization as the easy culprit. International or concurrent political climates could tip the balance (Davies & Guppy, 1997). Astiz, Wiseman, and Baker (2002) pointed out that policy trends that have come with globalization include trends toward decentralized governance, especially for developing nations.

Parallels between Canada, the United States, Australia, and the United Kingdom, for example, are striking. The forces of globalization allow policy ideas to spread quickly, especially between countries with shared languages, cultures, and colonial histories. Globalization is clearly related to institutional convergence (Astiz et al., 2002; Davies & Guppy, 1997). International assessments may encourage intercountry comparisons in education; countries like Britain, Canada, and the United States have often reacted to poor national performance with more assertive national priorities (Davies & Guppy, 1997). The rhetoric of *A Nation at Risk*, *Rising Above the Gathering Storm*, and other policy reports that evoke an educational call to arms in the United States have leaned on standards-based reform and accountability as policy recommendations. Even in the text of NCLB, the urgent need to improve academic outcomes mirrors the language of international education competition.

Globalization, policy diffusion, and cross-national competition may just be dressed-up names for the real reason nations are actually changing—fashion. In much of the literature, authors refer to the motivation for decentralization as keeping with a current trend, a fad. One author says, “Adopting policies of decentralization has become more or less a universal fashion among governments” (Mukundan, 2003, p. 27). This “fad-like” tendency raises the question of whether, in the United States or otherwise, these governance changes will last. In theory, trends in the political arena often come and go with the waxing and waning of public enthusiasm (Downs, 1972). In practice, policymakers may be driven largely by the need to try the most recent trend in educational restructuring. In the United States, this may actually help to understand how, even though the United States is already highly decentralized, and even though the nation is modifying some of its educational policies to be more centralized, it still gives lip service and makes some modifications that tend more toward decentralization.

Donor Pressure

Besides the attractiveness of these structural changes as the current reform of choice, explicit and implicit international pressure may come into play. Developing nations may feel pressure from aid-granting organizations to decentralize some education governance (Fiske, 1996). Because of this, different motivations for centralization and decentralization exist for countries with different economic and social climates.

For developing countries, one concern may be the desire to introduce modern management systems (Liou, 2001), in particular because of donor pressure. Further, many development

organizations explicitly emphasize administrative reforms in their lending policies (Astiz et al., 2002; Liou, 2001), whether because of concerns about corruption, bureaucratic inefficiency, or philosophical support for decentralization. High-income donor countries look to peers like New Zealand as examples supporting their requirement that development aid be tied to decentralized restructuring; New Zealand's efficiency-oriented political and economic reforms attracted much attention upon their implementation.

However, the relationship of decentralization and development may be lauded greatly by proponents (development agencies, etc.) but may be more tenuous when tested (Conyers, 1986). The push for decentralization by donor agencies provides an interesting contrast to educational policy in the United States; although the United States has been a major part of the donor agencies pushing decentralization, it has implemented contrasting policies for itself.

Administrative

Administrative motives (e.g., logistics, feasibility constraints) could also lead policymakers to create more or less centralized policies. For example, countries that put a high value on efficiency could possibly justify more centralized handling of teacher certification to expedite national teacher deployment. Mexico chose to reform its education governance for this very reason; the country had been having problems with distributing teacher salaries and turned to a change in centralization to address this issue (Fiske, 1996). Other administrative motives could include a response to financial issues; in the United States, states have come to comply with NCLB reporting requirements because of the incentive of additional funding, not because they were mandated to cede power to the national policymakers.

Administrative motives can also refer to the logistical needs of a country. India, as a developing country, has been subject to the extra pressure from international organizations to adopt decentralizing policies as a development solution. A number of long-standing policies in the country (e.g., national high school exams) are nationally centralized. However, factors beyond development efforts necessitate some decentralized components. Factors such as very distinct regional languages, cultures, and environments have necessitated local implementation of some dimensions (e.g., the school calendar differs from state to state because of differences in local climates and the corresponding agricultural calendar).

Ideological

A country's choice to move to more centralized or more decentralized governance may be more of an ideological preference. For example, the idea and motive behind some decentralization efforts is to give citizens more direct authority over decision making as a principle in and of itself. In the United States, the "preference for local control of education dovetailed with the broader ethos of the American Revolution and the Founders' distrust of distant, centralized authority" (Miller, 2008). Across the nation, there is a deeply and traditionally held belief that education should be intimately related to and overseen by a local entity.

Zimbabwe's decentralization efforts arose from the growing political movement for individual empowerment; decentralizing public services as much as possible was the goal. In the mid-1980s, local community councils were given the authority to construct and manage primary schools. The national ministry retained the authority to hire and pay teachers and disburse per-pupil funds

to communities, but community control was aligned with the “socialist spirit” of the day (Fiske, 1996). Whether from a strong tendency toward individualism and individual determination or from a political movement empowering a whole class of citizens to own the education system, political philosophies may spur the restructuring of education systems. These ideological motivations, in fact, may come into conflict with other motivating factors for educational reform. Policymakers may have to weigh philosophical tendencies, administrative needs, financial restrictions, and numerous other factors in order to decide whether to direct reforms toward centralization or decentralization. This complex mix of push and pull factors may be the reason for which the United States of the 21st century finds itself with a decidedly changed educational structure while it remains unclear whether the overall trend has been in one direction.

THE PROCESS—STRUCTURES, PLANS, AND CONTEXTS

It is important to reiterate one of the main corollaries of this work: decentralizing and centralizing policies are often mixed. They can be complementary (as in increased federal-level accountability with increased local management), or they can run in parallel (e.g., increased central control over curricula and increased local control over teacher hiring). As McGinn and Street (1986) described, centralization—decentralization is not merely a continuum; it is also “a dyadic relation in which the elements have no meaning taken alone” (p. 472). In each context, there are particular domestic factors at play that could motivate change in either direction. Exterior forces and the international climate could also cause change in either direction.

I turn now to the ways in which exemplary countries have structured and implemented their various policies, as well as the contextual factors that surround these reforms. Broadly speaking, Latin American nations illustrate a variety of mixes between centralized control and decentralized action. South Asian countries also provide a number of interesting examples of centralized governance coupled with decentralized policies. Examples from other regions illustrate the multitude of combinations of centralized and decentralized structures arise from relevant historical, economic, and social characteristics. I look at each context specifically, rather than by the type of structure (as in the previous section).

India

In one specific example, Kerala, a state in southwestern India, adopted a state-level decentralization policy. Despite widespread political support for the idea of localized individual decision making, Mukundan (2003) pointed out that individuals were not actually enabled in important decision making. Rather, the political wording that described the system was altered, but the governmental decision-making process was not fundamentally changed.

India’s system, although more centralized than the system in the United States in having national exams and standardized curricula, has always allowed some powers for its diverse states through a federal system. Community councils were added in 1995 as another important level of governance, with educational powers such as raising funds or overseeing teachers. Ruling elites took over the regulation of some of these councils, and traditionally marginalized populations often had trouble having their voices heard (despite empowerment being a central point of the reform). Overall, though, the reform continued to move India towards more decentralization (Fiske,

1996); this trend fits with India's traditional roots in community participation and grassroots-led social movements.

This established characteristic of Indian politics is clearly illustrated in a more recent district empowerment program. Varghese (1996) examined the success of a district empowerment program, which supports planning and resource enhancement at the district level. In some cases, centralized decision making was initially necessary for these transitions to take place. However, the goal of decentralization remained. Even by using more centralized offices, educational institutions channeled more authority to policymakers at the local level. This example illustrates how central and local offices may both be involved in the process of educational restructuring, an important (sometimes contentious) relationship that American policymakers must carefully navigate.

Spain

As the Franco reign in Spain ended, Spain's new government explicitly took into account the nation's regional diversity in order to address unrest and breakaway tendencies. The new government transferred funding and authority to the diverse regional governments. Later, regional education systems were further localized by the provision for school-based management systems. Elected school councils today control nearly all decisions, except teacher hiring and degree granting. There have been some areas where assimilation with the locally controlled schools has been slow, but overall, Spain's transition to highly decentralized governance is often cited as exemplary.

Brazil

When Minas Gerais, a state in northeastern Brazil, faced pressing education quality problems in its primary school system, it enacted a number of locally empowering changes that gave authority to communities, whereas some functions, such as union bargaining, were maintained at the central level. Results from this decentralization process were mixed. Lacking training, some of the local school boards had trouble asserting their authority (Fiske, 1996). I discuss other consequences of de/centralization processes in the next section.

THE PROCESS—END RESULTS

Having looked at the causes and constructions of numerous education governance reforms, I now describe some examples of observed consequences of these actions. Are the motivations and subsequent actions for centralizing or decentralizing governance aligned with the observed outcomes of these policy changes? Do efforts toward more decentralized governance actually result in more locally tailored education policies? Do efforts toward more centralization translate to more national-level control for financing and other decisions? How is success even measured in educational centralization and decentralization? In this section, I again review a number of cases of centralization/decentralization that led to positive, negative, or mixed outcomes.

Overall, the correspondence between objectives and outcomes is not clear. Similar motives and structures may not even lead to similar outcomes across varying contexts. I describe here a

number of situations and their outcomes in an attempt to better understand the possible outcomes of choices elsewhere or in the American context. In general, the evidence provided by these examples is inconclusive; centralization or decentralization policies do not always achieve stated goals. Attempts at empirically evaluating decentralization may, however, indicate some positive effects (e.g., Gallego, 2010). Despite this, the difference between policy and implementation is especially difficult to decipher when the policy change is a change in the policymaking structure itself. And further, immediate outcomes may not reflect long-term consequences.

Some decentralization programs have reported success in student academic outcomes (New Zealand, Brazil), whereas others have not (Chile). Some report success in efficiency (Mexico), whereas others report increased difficulties—Papua New Guinea reported increased costs and inefficiency from creating numerous new government bodies; added training for these bodies was needed. Time may play a role—Spain's decentralization was implemented over time and succeeded, whereas Argentina's was implemented quickly and failed (Fiske, 1996).

As countries transition from authoritarian regimes, newer political mechanisms are often put in place to empower a wider set of interests and populations (Hanson, 1989). In Colombia and Spain, stepwise transitions from a highly centralized education regimen to more regional control have allowed for periods of adjustment. Venezuela, on the other hand, has had difficulties integrating its policies, as they have often been instituted in a sweeping, overwhelming fashion. Political deadlock has resulted from inefficiency and a lack of continuity and later from local reticence to take on responsibility for difficult schools (Fiske, 1996). Such challenges illustrate the need to understand how the process of centralization or decentralization unfolds, and the following examples provide practical insight into this timeline.

Mexico

Mexico's decision to decentralize governance arose out of bureaucratic difficulties, especially with teacher payment. The major components of the decentralization reform included transferring oversight of basic education to state governments, in particular the administration of primary schools and the hiring, pay, and accountability of teachers. Resistance from teachers unions, who did not want to negotiate with more than 30 state governments, initially hampered decentralization efforts, but by the early 1990s the reform was introduced. The Mexican teacher's union, one of the most powerful political entities in the country, had to be included in the negotiations process for the reform to ultimately be approved. An analysis using results from an international test (Programme for International Student Assessment) has found that decentralization in this case improved learning outcomes (Alvarez, Moreno, & Patrinos, 2007; Santibanez, Vernez, & Razquin, 2005).

Zimbabwe

Political disagreements over Zimbabwe's individualist reforms caused the process to stall. At the time of the reforms, the central government wanted to bypass the community councils and give funding to school-based parent groups to ensure greater accountability and efficiency of funding use. The community councils blocked this measure, and the decentralization fight went on. Ultimately, a strong national government recentralized key decisions such as teacher hiring and forced some amount of parental involvement on schools (Chikoko, 2009; Naidoo, 2002).

Chile

Ideologies may be responsible for decentralization policies in Chile. Neoliberal economics and politics guided some of the American-trained policymakers in Chile in the 1970s. During this time, authority for education management was transferred to the municipalities. The regime's reforms responded to views on previous systems by banning teacher unions and taking away teacher tenure. Although local authorities gained responsibilities such as hiring and firing teachers, they had little autonomy over curriculum and even less room for local stakeholder participation. Economic difficulties suspended even these decentralization efforts. It was not until the transition to a democratic government in the 1990s that decentralization efforts succeeded. Focus on pedagogical decentralization with a strengthening of central, regional, and municipal bodies ensured a more democratic form of organization and parallels other instances of mixed decentralization (Fiske, 1996; van der Wal, 2007).

Argentina

One possible precedent for decentralization is a need for additional resources; by localizing the collecting agency, a group may become more vested in gathering funds for itself, and funders (parents) may become more motivated to provide the funds because their direction would be locally controlled. In Argentina, this justification was used for the first attempt at bureaucratic decentralization in 1975. However, it may have been meant and was perceived as an attempt by the central authorities to weaken state-level authorities by giving them added fiscal and administrative burdens. As such, this attempt at decentralization failed. More recently, in 1993, both provincial and national governments agreed on a more mutually beneficial arrangement for decentralizing financial responsibility (Fiske, 1996; Kubal, 2003).

INTERNATIONAL PERSPECTIVE ON SPECIFIC SECTORS OF EDUCATION GOVERNANCE

International examples of centralization and decentralization in specific sectors of governance inform the understanding of the American context. I present illustrative examples here that correspond to the questions addressed in the rest of the issue as well as additional sectors of interest.

Teacher Certification

Securing certified teachers for the most rural areas of Sub-Saharan Africa is very difficult. In countries such as Mozambique, Lesotho, and Tanzania, there is a significant difference in the proportion of "qualified" teachers teaching in urban versus nonurban environments (Mulkeen, 2007). Both supply-side and demand-side factors are given as possible explanations for these problems. Often, teachers give reasons why teaching in rural areas is less desirable. Distance from family, different languages, and health concerns are among the problems cited by teachers

as reasons for avoiding teaching in rural areas. In Mozambique, teacher training and subsequent deployment is done on a regional basis, so nonurban areas are forced to employ higher numbers of nonqualified teachers. Compared to the African context, training and certification in the United States is much more decentralized.

Indonesia provides an interesting case study of teaching and how stakeholders within the education system may or may not adhere in practice to decentralization efforts. Indonesia's teachers were historically certified and employed by the government—all of the schoolteachers in the country were public servants. Under Suharto's militant government, extreme loyalty to the administration was strictly enforced; teachers became "transmitters" of central ideology rather than community representatives (Bjork, 2003). Schools were, in fact, used by the government as a tool to create a nationalist identity. In the early 1990s, the government instituted a number of decentralization policies, despite its previous behavior. One of these policies involved allowing more local control over the curriculum. Despite small changes in language used by teachers to describe these new curricula, classes (Bjork, 2003) were virtually unchanged. One explanation offered was that the civil service culture held by teachers who were still certified by the government made it difficult for them to change their implementation of the classes. This level of national identity for teachers is not present in the United States context, possibly implying that changes to allow for more local control of the delivered curriculum may be more easily facilitated. Or, conversely, it may imply that efforts to standardize a national curriculum may confront localized teacher identities and be difficult to implement.

Education Finance

Gershberg and Meade (2005) described how the Autonomous Schools Program in Nicaragua shifted a large portion of funding and other decision-making responsibilities to parents in school-site councils. The radical decentralization program allowed local committees of parents, students, and teachers to institute monthly "voluntary" contributions from parents. These councils were then allowed full discretion over the spending of these funds. Some areas chose to provide performance incentives for teachers, because teacher salaries were relatively low in the country. However, it was debatable how voluntary the contributions were, and poorer communities were less able to locally provide necessary resources.

Negash (1999) provided a case study of the implications of governance changes in Ethiopia for education planning and budgeting. As the country transitioned out of a centralized monarchy and military-communist regime via drastic constitutional changes, authorities at the subnational levels (regional, subregional, and district) assumed responsibilities that had previously been centralized. These responsibilities included educational planning and budgeting activities. Difficulties with manpower for training support hampered such developments, though. The complexities of a multilingual and multiethnic country both supported the need for decentralization and created administrative and financial challenges as the country reformed its system. Administrative capacity building has since allowed regional authorities to assume full educational responsibility, including oversight of education finance for their constituencies.

Reschovsky (2006) also addressed the decentralization of education finance in South Africa. After apartheid, funding and resource inequalities were greatly reduced, but quality discrepancies

such as highly qualified teachers and facilities persisted. Funding decisions (not provision, as national authorities still distributed funds) came instead from provincial governments. This allowed for more flexibility and discretion in public school funding schemes and gave schools the options of raising fees. Although inequalities persisted, inroads into reducing inequality were made. Compared to these examples, the United States has traditionally been much more decentralized in education finance. More recent funding opportunities (e.g., financial incentives from NCLB) are offered at the national level, but the great portion of educational funding comes from local taxes.

Language Policy

In France, the debate over language of instruction has some features similar to that occurring in the United States, as both countries are dealing with a polarizing immigration debate that has implications in terms of race and home language (mainly from the North African Maghreb for France and from Mexico for the United States). Added to this, however, is the dimension of regional languages within France that have been a part of this debate for a long time. For example, in the Northern Basque Country region of France, the lack of institutional support for the Basque language may be contributing to the language's decline in use. Across the border in Spain, decentralized policies intended to quell separatist movements have allowed for Basque to be used as a language of instruction, which may have mitigated the decline in the everyday use of the language (Cenoz, 2000). In the United States, language policy has been similarly decentralized, but the impetus comes from the judicial branch.

Achievement Gaps

South Africa's racial schooling gap persists despite steady decline in the difference between African and White student attainment (Anderson, Case, & Lam, 2001; Reschovsky, 2006). Enrollment is nearly equal, but grade repetition is responsible for a large differential in primary and secondary educational achievement. Lower attainment is also associated with lower school fees (implying lower school quality). In post-apartheid South Africa, non-White citizens have greater choice in where to send their children to school, but quality may still be an issue.

Both centralizing and decentralizing forces have been in play in South Africa, and their dual presence may be helping to ameliorate the racial schooling gap. First, decentralization in terms of choice has allowed some of the wealthier non-White citizens who still live in the townships to send their students to higher quality schools in different districts. It has also allowed some of the more privileged schools, which had to sacrifice some of their public funding, to set up parental councils that could charge compulsory fees in order to maintain the quality of the schools (Karlsson, 1996). This component has not necessarily allowed for more equality; however, more centralized governance (in some cases at the provincial level) has assumed the role of ensuring equality, as was also the case with education finance.

In a comparative study of educational centralization to promote diversity in higher education, both the American and Dutch contexts show that diversity has not decreased; however, there is not clear support for the idea that centralization promotes diversity (Huisman & Morphew, 1998). Decentralization reforms are often spurred by calls to recognize diverse populations or to support

differing educational needs (e.g., language, religion) within one country. Decentralized structures supposedly allow for concentration on populations in need, which in a completely centralized system may become lost in educational administration for a majority group in power. However, the examples cited here call this argument into question. Policymakers must be cautious that centralization and decentralization efforts do not in fact exacerbate inequalities already present in the education system.

DISCUSSION AND CONCLUSION

These examples show the plethora of centralization and decentralization stories that can be told around the world. Comparing these responses to the development in the United States, the United States emerges as a decidedly decentralized entity, even after its recent shifts. I have also looked at the various causes and motivations that have pushed other countries toward centralizing or decentralizing certain components of their educational governance. I have illustrated how different structural approaches to shifting decision making have taken place and that it is difficult to predict the outcome or even the success or failure of a structural change; however, some of the examples provided may begin to shed light on helpful characteristics.

I return to the four research questions. First, what is the tendency of the American centralization of educational policy, and where are there comparable examples? In a sample of Anglophone/English-heritage countries, there is a push for more national oversight of educational policies, specifically around testing and accountability. However, in response to the second question, most countries are pushing for more decentralization of educational policy. Due to the predominant neo-liberal political environment and its influence through major international institutions, the diffusion of educational responsibility seems to be the rhetoric of the day. The United States has been in this position for the greater part of the 20th century; one of the largest, most localized education systems, the U.S. system remains in this position today even as it inches toward some more centralized decisions. As it tiptoes toward more centralized structures, educational stakeholders must recognize that political trade-offs are being made and that steps in the decentralization—centralization dance are being taken in both directions. Whether in the United States or in education systems worldwide, the process and components of centralization are quite complex, sometimes ambiguous, and often nonlinear.

Studying the governance tendencies of the hundreds of other education systems available as references can help guide the understanding of the development of American education governance in the 20th century. It can also help to understand the possible future growth of the system. As mentioned, there is a chance that this global tendency toward decentralizing may be a fad, either globally or within the United States.

International Pantheon

In the broad and varied spectrum of governance systems, the United States finds itself much further toward the decentralized end of the scale. Despite recent trends toward higher centralization, America's new trends toward "co-operative federalism" have not outweighed contemporary preferences for management techniques that tend toward local management or the American historical preferences for state and local rights. The United States is, in the literature on education

governance, often chosen as the most exemplary decentralized system. As early as 1647, the “Olde Deluder Satan” law empowered local groups to be responsible for the schooling of children under their purview. Perhaps because of its tradition as a hallmark decentralized system, the United States finds itself adding components or best practices observed elsewhere that might be characterized as more centralized functions. Broadly speaking, though, the trend in the rest of the world (traditionally more centralized) is to add new management techniques that would be characterized as more decentralized.

So where in the pantheon does the United States stand? In the world context, the United States seems to be traditionally more at the decentralized end of the spectrum. However, it seems to be moving toward the middle, especially with developments in the last 10 years, as many other countries look to decentralize their practices. Perhaps future comparisons will find more homogenous education governance structures internationally, as countries overall move toward this notion of mixed centralization and decentralization.

AUTHOR BIO

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Education and the Constitution

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The last 50 years have seen a massive increase in the federal role in public education in the United States and a marked increase in the tension between the federal government and the states with respect to control over education. This article investigates the history of education in America, particularly with respect to federal versus state power. By examining primary sources from the colonial and postcolonial periods, we can glimpse the thoughts and motivations of the United States' most influential thinkers and leaders, as they were helping build a new country. Furthermore, the decisions of the Supreme Court on education shed light on the history and role of education in our society today. Fundamentally, this article asks the question, Because the federal government plays such a large role in public education, where is education in the Constitution?

"Above all things I hope the education of the common people will be attended to, convinced that on their good sense we may rely with the most security for the preservation of a due degree of liberty."—Thomas Jefferson, Letter to James Madison, December 20, 1787

In a time of bitter partisan rancor in Washington and around the country, coupled with overwhelming gridlock in Congress, education remains an issue that has the potential to bridge the divide. In recent years, the federal government has passed billions of dollars of new education spending in the form of Race to the Top, the Teacher Incentive Fund, and the Investing in Innovation Fund. These new programs, and others, come in addition to the landmark reauthorization of the Elementary and Secondary Education Act (now referred to as No Child Left Behind) during the Bush administration.

In addition to the advent of such massive federal investment in education, groups such as the Tea Party have made a new reverence for the Constitution a cornerstone of their electoral platform. In an effort to appeal to voters with calls to the traditional values of the United States and its Founders,¹ candidates, and not just conservative ones, have espoused the need for a renewed commitment to the text, values, and dictates of the United States' founding document.

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¹This article deals in some respects to the popular conceptions of the Constitution and American history, as well as Supreme Court precedent. Therefore, when the article speaks of the "Founders" or the "Framers," it refers to that familiarized and popularized concept that most American history textbooks and general society uses and employs that term as a cultural touchstone and (admittedly) as a kind of easy shorthand.

There is a disconnect between these two trends. On one hand, politicians, political parties, and Supreme Court justices have proclaimed a new faith in and adherence to the Constitution. On the other hand, interest in and spending on education by the federal government has hit an all-time high, with nary a mention of education anywhere in the Constitution itself.

Even in light of all this federal action, or perhaps because of it, state governments have been far from apathetic. In the last 2 years alone, states such as Tennessee, Wisconsin, Indiana, and New York have passed unprecedented legislation on issues such as curriculum, collective bargaining by teachers, teacher evaluations, data systems, charter schools, and vouchers. With so much activity from all aspects of government, there remains a profound tension between federal and state roles in education, in addition to the tension between federal programs and the text of the Constitution.

Where, then, is education in the Constitution? Does the federal government have a role to play? How can it? The federal government has defined an increasingly large role for itself in education since the middle of the 20th century, with broad support and very little criticism, either from the public, Congress, the president, or the courts. And yet the fact remains: There appears to be very little, if any, constitutional authority for such action. In the most literal constitutional sense, the states remain the leaders in education legislation. This article examines the tension between the centralizing role of the federal government and the states. It does so in the context of why education fails to appear in the Constitution. To explain the origins of the constitutional language, the article begins in the 18th century and attempts to piece together not only the thinking of the time period but also the motivations behind the actions taken (and not taken) by the Founders of the United States.

Although there are numerous plausible explanations as to why education was not included in the Constitution or the Bill of Rights, there remain a number of mysteries and contradictions surrounding the question and its context. For example, the Northwest Ordinance of 1787 (n.d.), passed by the Congress of the Confederation, holds that, as “religion, morality, and knowledge, [are] necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged.” This clause is among those that the Ordinance *required* all new territories to include in their constitutions as prerequisite to becoming a state. Clearly, then, the members of the Congress of the Confederation (many of whom would draft the Constitution and the Bill of Rights) valued education. The fact that this clause exists within the Ordinance also lends support to the idea that education might have been viewed as within the purview of the state. Other clauses within the Northwest Ordinance, however, later appear as rights within the Constitution’s Bill of Rights—and many scholars agree that the Bill of Rights was based, in large part, on the Northwest Ordinance. Why did education make it into the Northwest Ordinance, but not the Bill of Rights or the Constitution proper?

Indeed many, if not all, of the Framers placed a high value on education. Thomas Jefferson is almost universally renowned within the education community for his famous pronouncements regarding education. But Jefferson was not alone. Benjamin Franklin, John Adams, James Madison, Benjamin Rush, and Noah Webster all wrote and spoke about the supreme importance of education in the new Republic. Even George Washington, the first president, left a large sum in his will in order to form a National University (Butts, 1978). Given the continuous, and often-times contentious, national debate over the role of education in American society, the question persists as to why education is not an explicit part of the Constitution, or as it is not, whether it should be.

HISTORICAL CONTEXT: EDUCATION IN 18TH CENTURY AMERICA

Scholars have long argued about whether the founders of our nation could have even envisioned a national system of education. Early American leaders, who were still grappling with the consequences of the Revolutionary War and the resulting new Continental government, may have lacked the time and capacity to develop a national educative system. As such, the tendency at the time may have been to leave education to the realm of the family, as had generally been the case for years. However, the zeal with which the Founders embraced new challenges and ideas, as well as their letters, debates, and essays, belies the simple assumption that education was not an issue being debated nationally, or among the Founders themselves. Moroney (1999), in her historiography of early American educational thought, gave a compelling overview of the educational debate among modern critics. She argued that historians of early American educational thought have critically selected works to represent views not truly representative of the period. Most of the leading historians of the early American time period, such as Allen O. Hansen, Lawrence Cremin, and Frederick Rudolph, focused on “leading” thinkers who often put forth national proposals for education systems and solutions. As Moroney pointed out, many of these thinkers were likely not widely read, and Hansen and Rudolph in particular ignored many of the other true leaders’ writings about education. (Jefferson and Franklin come to mind.) Moroney contended that many historians of this subject simply—and wrongly—reflect certain beliefs about the value of centralizing education in their representative selections. In the end, she concluded,

We have unwittingly adopted a non-representative sample, even after our discipline’s many biases had been pointed out. Not only did other philosophies of education coexist with the canonical ones, those philosophies frequently dominated public discourse. Once we pull those philosophies into the foreground, our portrait of the early republic will be significantly different from what it is now. It may not be a picture to serve our modern agenda, perhaps even running contrary to our contemporary educational needs, but it will be a more accurate picture and thus better history. (p. 491)

Given Moroney’s scathing assessment of the historical research into early American educational thought, we must remember that, by and large, grand schemes of a national educational system were not necessarily the dominant theme of national discourse. Education was still local, tied to religion, and far from universal. That does not mean, however, that this theme was not present. The voices that were speaking about universal and national education, though they may have been relatively few in number, were certainly influential on the national stage. Although it would be a mistake to view those voices as representative of general thought in the period (as Moroney cautions), the very existence of these voices and ideas is evidence that, in some form, a national and universal system of education was not in any way beyond the realm of possibility. The idea that education is missing from the Constitution because a national and universal system was simply unthinkable at the time is almost certainly false.

A comprehensive history of early American educational thought is beyond the scope of this article, but an examination of writers of the period, especially those who might have had influence in the drafting of the Constitution and the Bill of Rights, is certainly instructive. Abiding by Moroney’s caution that we must not take a few pieces of writing as representative of the majority of thought at the time, there were in fact several prominent writers discussing the idea of public education before and after the Constitutional Convention. The notoriety and national stature of

these writers, the connections they had with delegates to the Constitutional Convention, and the possible effect they may have had on the ideas and plans of their contemporaries, make them worthy of consideration, despite the fact that their writing is not representative of the *general* thought at the time. This article seeks out those who, like today's lobbyists, had particular influence or power at the time, especially as connected to the national politicians who would ultimately leave education out of the Constitution.

Of course, programs of education existed in America long before the Revolution or Constitutional Convention. Butts (1978) pointed out that the colonies had a fair amount of autonomy granted to them by the king and parliament, and many, if not all, passed education-related legislation in town and colony legislative bodies.² Several well-known examples of such legislation include the Massachusetts School Law of 1642 and "Ye Olde Deluder Satan" Act in 1647. In fact, until the 18th century, the educational tradition in the northern colonies was rather strong. Puritans held literacy instruction as a core value and inculcated it into their laws and practices. However, no real "system" of schools existed in the way that we would think of them today. Despite the lack of a centralized system, education clearly played a strong role in several of the colonies more than 100 years before the Declaration of Independence, the Revolution, and the Constitutional Convention.

This relatively strong basis began to erode in the 18th century (Butts, 1978). Early colonies were relatively homogenous religious entities, especially in the Northeast, where educational traditions and legislation were strongest. During the 18th century, immigration into the United States, as well as the expansion of the colonies westward, began to weaken the homogeneity of the individual colonies. Although many of the early colonies had established nascent educational systems, generally tied to a common religion, the flood of immigrants, mostly from northern Europe, changed the face of education in colonial America. As Butts (1978) explained, "The trends of the eighteenth century served to overshadow the idea that schooling should be public in purpose, public in access, public in control, and public in support" (p. 4). Incoming religious minorities, such as Baptists, Methodists, Quakers, and Mennonites, were uncomfortable with the close relationship between education and the established religions, which were mostly Puritan or Congregationalist. In addition, as the colonial population began to expand westward, the homogenous, close-knit communities that facilitated and supported education in the New England colonies began to disintegrate. Further, colonial authorities began to grant many different groups and individuals charters, which allowed these individuals to act as trustees, founders, or operators of schools. As a result, the proto-unified "system" of education that had begun in the New England colonies in the 17th century began to fall apart in the 18th. As a result,

The "public" purpose of education that had based the welfare of the commonwealth upon the doctrines of an established church was giving way to the "private" purposes of a variety of religious beliefs seeking freedom from government control. The idea of public support of "free" town schools available to all and financed at least in part by tax funds was giving way to the practice of "free" charity schools intended for poor children. . . . At the same time, government management and operation of schools were increasingly giving way to control by private boards of managers. Public access to town schools, open at least in theory to all the children of the community, was being superseded by schools intended

²Professor Butts tackled the issue of education and the Constitution in a chapter of this book, and I am greatly indebted to him for his research into pre-Revolution educational history and trends as well as some of his speculation about the Constitution itself.

primarily for children of similar religious, linguistic, cultural, or social backgrounds. (Butts, 1978, pp. 5–6)

This wave of immigration began to change the character of the colonies, not only in terms of education but also in terms of religion, governance, and language (Butts, 1978).

The growth and political changes of the 18th century remade the face of the British colonies in America. The small, homogenous communities that had once characterized the colonies became less typical, and more radical changes in politics, values, culture, and education began to take place. The mid-1700s were a time of invention, experimentation, and radical thought in America as well as in Europe. These experiments extended not only to politics and philosophy (e.g., Thomas Paine's *Common Sense*) but also to experiments and progress in education.

In examining some of the leading authorities on education, even Moroney (1999) admitted that "Rush and Webster's essays were likely to have been read or discussed. Rush's political prominence and Webster's near domination of the market for children's textbooks meant their ideas held particular interest for Americans" (p. 482). Benjamin Franklin, a man of undoubted prominence and influence later in his life, wrote his *Proposals Relating to the Education of Youth in Pennsylvania* as far back as 1749. This tract included many progressive educational proposals, from funding for maps, scientific instruments, and libraries to the teaching of accounting, geometry, astronomy, natural philosophy, and agriculture, among other subjects (Blinderman, 1976). He would not have required the teaching of Latin and Greek, but would make those subjects available to those who wished to study them. This plan did result in the creation of an academy in Philadelphia, but one that did not hew to the progressive standards and ideas Franklin had imagined.

In his 1790 work *On the Education of Youth in America* Noah Webster, another renowned scholar, argued that the "education of youth is, in all governments, an object of the first consequence" (Rudolph, 1965, p. 45). He then outlined his idea of a progressive, modern school system.³ In particular, though recognizing that the United States' "constitutions of civil government are not yet firmly established" and that the country's "national character is not yet formed," Webster implored the readers of *The American Museum*, a literary magazine of the period, that

Systems of education should be adopted and pursued which may not only diffuse a knowledge of the sciences but may implant in the minds of the American youth the principles or virtue and of liberty and inspire them with just and liberal ideas of government and with an inviolable attachment to their own country. (Rudolph, 1965, p. 45)

Webster went on to claim that governments must provide legislation to form *systems* of education, providing land and revenue to fund them, as well as committing to "every class of people," arguing that the "constitutions are *republican* and the laws of education are *monarchical*" (Rudolph, 1965, pp. 65–66).

Other writers argued similarly, particularly after the Constitutional Convention. Among them were Robert Coram and Samuel Knox, the latter a writer, clergyman, and educator who shared a prize for the best essay on education given by the American Philosophical Society. Knox's

³Moroney (1999) singled out this volume as one of the foundations of the misperception of educational beliefs and debate in the early republic, yet for the purposes of this chapter, the essays contained within, including essays by Webster, Coram, and Knox, discussed next, provide some useful exemplars of national educational thought and plans.

1797 submission,⁴ published 2 years later, and artfully titled “An Essay on the Best System of Liberal Education . . . also, an Uniform General Plan for Instituting and Conducting Public Schools, in This Country,”⁵ contains an exhortation to establish “an *uniform system of national education*” (Rudolph, 1965, p. 311). In his 1791 article “Political Inquiries: to Which is Added, a Plan for the General Establishment of Schools throughout the United States,” Coram, a librarian, Revolutionary war veteran, and sometime teacher, discussed the “practicability of establishing public schools throughout the United States,” relying on local and state taxation and land grants, while acknowledging that “education of children should be provided for in the constitution of every state” (Rudolph, 1965, pp. 113, 139).

Admittedly, these writings were almost certainly not representative of the *dominant* thought on education during this period. Moroney (1999) highlighted three main disagreements between these writers and the dominant expressions of educational thought: (a) the role of religion, (b) egalitarianism, and (c) whether education was a national (as opposed to local) concern (pp. 483–487). On all three points, Moroney found evidence that these writers did not represent the dominant thought.

Whereas writers such as Webster, Knox, and Coram generally differentiated religion and education, many (if not most) of their contemporaries still closely tied the two together, including Benjamin Rush (Moroney, 1999, pp. 483–484). Although the new American society was ostensibly a meritocracy, without the archaic structures of class and nobility, there continued to rage a debate about the proper role for certain American professions, such as yeoman farmers, and many of the new American leaders, such as George Washington, were granted status and lands that were a close echo of the system of nobility the new country had supposedly left behind. A completely egalitarian system of schools, especially with the malignant, unresolved question of slavery, was certainly not representative of the dominant thought at the time.

Despite these caveats, the aforementioned authors do illustrate one important point: Many prominent thinkers were thinking and writing about education, particularly the idea of some sort of national system, contemporaneously with the Constitutional Convention and the creation of the Bill of Rights. In fact, though Moroney disparaged their inclusion in the canon of educational thought, two French writers, Du Corteil and Du Pont de Nemours, demonstrated the existence of a contemporaneous national, centralized system of education in France and the likelihood that at least some were advocating for a similar system in America (Rudolph, 1965).

Hansen (1965) argued that both Amable-Louis-Rose de Lafitte du Courteil and Pierre Samuel Du Pont de Nemours were active and influential in American life and politics. In particular, Du Pont de Nemours was an “intimate friend of Franklin, Jefferson, and other Americans,” a “political economist and statesmen,” “secretary of the council of public instruction in Poland,” and “active in negotiating the independence of the United States in 1782,” among other pursuits

⁴Moroney (1999) rightly pointed out that this “prize” is of somewhat dubious distinction: “Qualifying this triumph, as Rudolph noted, is the actuality that a mere eight essays were submitted to that contest. . . . In fact, there are indications the winning essays did not garner wholehearted endorsement from the Society. . . . Moreover, the introduction to the first publication of Smith and Knox’s essays, written by a secretary of the Society, expressed some disappointment with the winning essays, an understandable sentiment as the four surviving manuscripts are poor ones” (p. 483).

⁵The complete, rather expository, title of Mr. Knox’s submission was “An Essay on the Best System of Liberal Education, Adapted to the Genius of Government of the United States. Comprehending also, an Uniform General Plan for Instituting and Conducting Public Schools, in This Country on Principles of the Most Extensive Utility. To Which is Prefixed, an Address to the Legislature of Maryland on That Subject (Philadelphia, 1799)” (Rudolph, 1965, pp. 272–372).

(Hansen, 1965, pp. 176–177). Although Du Pont de Nemours's essay "National Education in the United States of America" was published in 1800, Hansen (1965) assured us that Du Pont de Nemours had been in contact with Franklin, Jefferson, and others long before that. Du Corteil's essay, published earlier (in 1797), was titled "Proposal to Demonstrate the Necessity of a National Institution in the United States of America, for the Education of Children of Both Sexes. To Which is Joined, a Project of Organization, etc."

For those that question whether a centralized, national system in America was even imaginable, these two writers prompt the question: If France had such a system, why not America? As Du Corteil put it,

After this representation of the principal national establishment that France offered to her children (where they were educated gratis), it is easily perceived that the creation of such institutions belongs only to the beneficent and paternal hand of government. If we have a little expatiated upon the enumeration of the different establishment in France, it has been only in order to indicate with a distinctive precision those which ought to be formed in the republic of the United States of America. (Rudolph, 1965, p. 247)

Despite the fact that these thinkers did not represent the *majority* of thought in the period, their ideas and discussions were circulating, particularly because many of them were well known on the national and political stage. Politicians, educators, and thinkers had thus begun envisioning a national education system and had begun to write on the subject. The notion that a national system of education, or the idea of the fundamentality of education to a republic, were concepts not present during the period in which the Constitution and the Bill of Rights were being created is simply untrue. Clearly, ideas about public education, education reform, and even a national system of education existed and were almost certainly within the knowledge of many of the delegates to the Convention and the early representatives in Congress who adopted the Bill of Rights.

On the other hand, many educational reforms of the period were happening at the state level, a trend shown most persuasively by the actions of Thomas Jefferson.⁶ Although known for his 1778 "Bill for the More General Diffusion of Knowledge" (which was never implemented), Jefferson also spent many years fighting for the passage of bills regarding education in Virginia. As Addis (2003) pointed out, Jefferson's bill was, in his own words (years later), meant to take the "axe to the root of pseudo-aristocracy" and create a true aristocracy—one of merit—which Jefferson believed necessary to lead the new American government (pp. 11–12).⁷ The bill was at once comprehensive, progressive, and incomplete, with a pyramid-shaped system of large numbers of grammar schools leading to more selective secondary schools, which finally led to a single state university. Poor students would be subsidized and both genders would receive basic education, though the government would not provide funding for women at any advanced level, and Blacks and other minorities were not provided for at all.

From the context and structure of his 1778 bill, it appears clear that Jefferson saw the states as the primary purveyors of education, but Hansen (1965) pointed out that in Jefferson's address to Congress a mere 8 years later, Jefferson "went so far as to advocate that there be added to

⁶For an excellent overview of Jefferson's education work, see *Jefferson's Vision for Education, 1760-1845* (Addis, 2003). Also see *Thomas Jefferson and the Development of American Public Education* (Conant, 1962).

⁷Jefferson's quote is from an October 28, 1813, letter from Jefferson to John Adams (Cappon, 1987).

the constitutional federal powers such matters as ‘public education, roads, rivers, and canals. . . . Education is here placed among the articles of public care’” (p. 183).⁸ Coming so early, Jefferson’s writings and successes in Virginia stand as an example that progress in education was already happening at the state level by the time of the Constitutional Convention and debate over the Bill of Rights.

In examining the educational writings and thought of the period, there are two strains that should be highlighted: (a) the practical, logistical planning of educational systems in the new republic, either at the national, state, or local levels, and (b) the connection of education to the new republic’s ideals of civic virtue, liberty, and republican duty. The logistical planning of education systems was undertaken by writers such as Jefferson, Coram, Knox, and Du Couteil, who took pains to actually work out how many schools, and of what type, would be needed and how those schools would be staffed and funded (Addis, 2003, pp. 12–14 [Jefferson]; Rudolph, 1965, pp. 136–145 [Coram], pp. 291–297 [Knox], pp. 254–268 [Du Couteil]). Other writers emphasized many of the civic and philosophical aspects of education, connecting them to virtue and patriotism. These writers emphasized that education was key to supporting the new republic’s continued success. These sentiments would be echoed 200 later in many Supreme Court cases dealing with educational rights, long after educational *systems* had been established.

CONSTITUTIONALIZING EDUCATION: STATE CONSTITUTION-MAKING AND THE CONSTITUTIONAL CONVENTION

Legislation touching on education, like “Ye Olde Deluder Satan” Act or Jefferson’s “Bill for the More General Diffusion of Knowledge,” was not limited to the state and local level, however. The Northwest Ordinance (1787; n.d.), and its older sibling the Land Ordinance (1785; n.d.), are often considered two of the very few large-scale achievements of the Congress of the Confederation. Historians tend to dismiss the Articles of Confederation as a reaction to the Revolutionary War, a temporary measure, or as a sort of training wheels for the Constitution to come. However, these two ordinances were heavily influential in the new country, and both contained provisions for education.

The Land Ordinance of 1785 began to accomplish one of the greatest tasks for the Congress of the Confederation: the disposition of western lands ceded to the federal government by the new states. States such as Massachusetts, Virginia, New York, and Connecticut originally had borders extending far westward, into Ohio territory as well as northward. After the war, these territories needed to be organized. Essentially, the Ordinance set up a series of surveyed townships in the new territories and included a provision that “there shall be reserved the lot No. 16 of every township, for the maintenance of public schools within the said township.”

Following the Land Ordinance, the Congress of the Confederation passed the Northwest Ordinance of 1787 contemporaneously with the meetings of the Constitutional Convention. This

⁸The citation is from Thomas Jefferson’s Sixth Annual Message to Congress, given on December 2, 1806. The quote more fully reads, “The question, therefore, now comes forward,— to what other objects shall these surpluses be appropriated. . . . Patriotism would certainly prefer its continuance and application to the great purposes of the public education, roads, rivers, canals, and such other objects of public improvement as it may be thought proper to add to the constitutional enumeration of federal powers.” (Thomas Jefferson’s Sixth Annual Message to Congress, 1806, n.d.).

simultaneity certainly raises the possibility that this act had an influence on the Convention delegates who were meeting at roughly the same time. Certainly these delegates would have been aware of it. The Ordinance contained a series of provisions that the territories would be required to adopt in their constitutions in order to become states. Years later, these provisions formed part of the basis for the Bill of Rights. They included free exercise of religion, habeus corpus, trial by jury, proportional representation in the legislature, prohibition of cruel and unusual punishment, due process protections guarding liberty and property, and bars on slavery or involuntary servitude.

As previously discussed, the Northwest Ordinance's provisions also included this sentence: "Religion, morality, and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged," (Northwest Ordinance, 1787, n.d.). Thus, through these ordinances, the new states entering the Union were *required* (albeit somewhat vaguely) to commit constitutionally to "encourage" education and to zone part of their new towns for schools. Admittedly, however, these requirements only applied to a handful of new states. The original 13 states already had differing provisions regarding education in their constitutions, with many of them already mentioning it in some form or another.

The colonies, of course, had been producing educational legislation for at least 100 years at this point. Most colonies had some schools (though nothing approaching a system), and many colonies had adopted legislation similar to Massachusetts' "Ye Olde Deluder Satan" Act. During and after the Revolutionary War, however, many states went even further and ratified state constitutions with explicit education provisions. In the years after the Declaration of Independence, 12 of the 13 colonies adopted state constitutions, and of those, at least six had constitutional provisions for education by the time of the Constitutional Convention (Delaware added a provision in 1792). By the mid-1800s, almost all the states had adopted constitutional provisions regarding education, but it is remarkable that so many had provisions so early.

Pennsylvania and North Carolina both adopted state constitutions in 1776, shortly after the Declaration of Independence. Both had particularly liberal visions of natural rights, and both included specific provisions for education. Pennsylvania, for example, included a provision that schools should be established "in each county by the legislature, for the convenient instruction of youth, with such salaries to the masters paid by the public, as may enable them to instruct youth at low prices" (Constitution of Pennsylvania, 1776, n.d.). Similarly, North Carolina included a provision for "a school or schools [to] be established by the Legislature, for the convenient instruction of youth, with such salaries to the masters, paid by the public, as may enable them to instruct at low prices," almost the exact same wording as the Pennsylvania constitution (Constitution of North Carolina, 1776, n.d.).

These provisions, aside from being so explicit so early on, contained some revolutionary principles. Salaries were to be paid from *public* funds, an idea finding sporadic purchase in the early colonies but which was still fairly revolutionary at the time. As discussed earlier, centralized and public educational systems within colonies had begun to fragment in the 18th century, due in part to the changing face and theories of education and in part to the geographic and population growth taking place across the colonies. Because of this turmoil, a truly public education system had yet to be established by the time of the federal Constitution. Both state constitutions purported to do this.

Georgia and Vermont ratified state constitutions in 1777, both of which contained provisions for education. Georgia's constitution has a brief section directing that "schools shall be erected in each county and supported at the general expense of the State, as the legislature shall hereafter

point out" (Constitution of Georgia, 1777, n.d.). Again, the idea of explicit public support for a widespread educational system shows up in Georgia's constitution. Vermont's constitution also includes provisions for education and echoes that of Pennsylvania and North Carolina, directing that a "school or schools shall be established in each town, by the legislature, for the convenient instruction of youth, with such salaries to the masters, paid by each town," as well as the fact that each county should have a grammar school and the state should create a university (Constitution of Vermont, 1777, n.d.).

Finally, Massachusetts in 1780 created a constitution with the most discursive section concerning learning and the arts:

Wisdom and knowledge, as well as virtue, diffused generally among the body of the people, being necessary for the preservation of their rights and liberties; and as these depend on spreading the opportunities and advantages of education in the various parts of the country, and among the different orders of the people, it shall be the duty of legislatures and magistrates, in all future periods of this commonwealth, to cherish the interests of literature and the sciences, and all seminaries of them; especially the university at Cambridge, public schools, and grammar-schools in the towns. (Constitution of Massachusetts, 1780, n.d.)

Massachusetts most clearly echoes the connection between education, virtue, and republican duty that Webster and Jefferson so prized. Massachusetts' constitution is less utilitarian than that of North Carolina or Pennsylvania in that it does not firmly establish an educational *system*. It does, however, contain the ideals of the educational revolution and echoes the pronouncements of the Northwest Ordinance.

New Hampshire also added a section to its constitution concerning education in 1784. Although somewhat less emphatic than the other states' provisions, New Hampshire attempted to safeguard the "exclusive right of electing their own public teachers" of the "several towns, parishes, bodies-corporate, or religious societies" as well as making sure that "no person of any one particular religious sect or denomination, shall ever be compelled to pay towards the support of the teacher or teachers of another persuasion, sect or denomination" (Constitution of New Hampshire, 1784, n.d.). This constitution further added a section not unlike Massachusetts' which "cherished" and "encouraged" the "interest[s] of literature and the sciences, and all seminaries and public schools, to encourage private and public institutions." At the time of the Constitutional Convention in 1787, then, many states had already built the constitutional foundations for systems of education, even if the schools, teachers, and systems were not yet truly established.

Of course, constitutional provisions do not necessarily mean free public systems of education. In fact, most of the states with constitutional provisions did little or nothing to establish educational systems until well into the 19th century. Eastman (1998) argued that most of the early constitutional provisions for education were merely "hortatory," that is, they announced ideals and constituted a grand "call to action" but were not practical in nature. He provided evidence that, even among those states that had such provisions (which amounted to only about half of the total states until well into the 19th century), none provided a system of public education. In addition, though many new states over the course of the 19th century had provisions for education, not many states built school systems until the latter half of the century. Indeed, some states did not even include education in their constitutions in will the mid- to late 20th century. Thus, the tension between the federal and state role in education very likely remained intact through the

Constitutional Convention, despite the fact that today states seem firmly in control of educational systems.

The evidence for state “control” of education before the Constitutional Convention is spotty at best. At some level, the discussion of education in the United States’ early history is necessarily going to be an investigation into thoughts and ideas, not structures and systems. The truth is that no state had any recognizable “system” of education, nor would the new Federal government, even after the ratification of the Constitution, be in a position to provide such a system. However, as the state constitutions show, a commitment to the *ideals* of a broad system of education was in evidence in many of the colonies. Many of the early state constitutions were similar, and clearly influenced the drafting of the Declaration of Independence, the Northwest Ordinance, and the Constitution. Given that the Constitution and the later Bill of Rights strongly echoed these state constitutions and earlier ordinances, one would expect that such a widely held sentiment would appear in the Constitution of the United States. Why, then, was it left out?

Although there is no explicit mention of education in the text of the Constitution, the question of education did, in fact, come up during the Constitutional Convention, albeit briefly and incompletely. On August 17, 1787, James Madison proposed a list of powers that would be given to Congress. Among the items on the list were the following powers: “To establish an [*sic*] University” and “To encourage by premiums & provisions, the advancement of useful knowledge and discoveries” (*The debates in the federal convention of 1787*, n.d.).⁹ Shortly afterwards, Charles Pinckney proposed similar powers for Congress, among them: “To establish seminaries for the promotion of literature and the arts & sciences.” Both proposals were submitted to the Committee on Detail (charged with writing the actual Constitution) but bore no later fruit. Madison’s record of the Convention is silent as to why.

About 1 month later, with the end of the Convention only 2 days away, Madison and Pinckney again tried to give Congress powers regarding education. On September 14, 1787, Madison and Pinckney jointly moved to “insert in the list of powers vested in Congress a power ‘to establish an [*sic*] University, in which no preferences or distinctions should be allowed on account of Religion.’” Seconded by James Wilson (who served on the Committee of Detail to which the earlier proposals had been sent), the motion was voted down after Gouverneur Morris stated that such a power was “not necessary” since “the exclusive power at the Seat of Government, will reach the object.” The vote was four for the proposal (Pennsylvania, Virginia, North Carolina, and South Carolina) and six against (New Hampshire, Massachusetts, New Jersey, Delaware, Maryland, and Georgia) with one divided vote not counting (Connecticut—one delegate voting yes, the other no). New York’s vote (if any) is not recorded.

Gouverneur Morris’s comment, though suggestive, remains open to interpretation. The standard reading is that Morris thought the “Seat of Government,” that is, Congress, already had the power to establish such a university if it so desired through its other enumerated powers. The Convention was nearly at a close, and, after 4 months of arguing, its members were likely wary of giving too many specific powers to Congress, with the impending ratification fight very much on their minds. This standard reading, however, ignores the fact that there is little direction as to

⁹Our knowledge of what happened at the Constitutional Convention comes almost wholly from the (copious) notes taken by James Madison. In turns frustrating and illuminating, these notes are the only formal record of what occurred, outside of letters written by the delegates. All quotations and references from the convention that appear in this article come from these notes.

where this power to establish a national university exists in the federal government. Some scholars argue that it comes from one of the broadest and most controversial of Congress' powers: the "general welfare" clause.

In Article I, section 8, the Constitution gives Congress the power to "lay and collect Taxes, Duties, Imposts and Excises, to pay the Debts and provide for the common Defense and general Welfare of the United States." For more than 100 years after ratification, the meaning of this clause was vigorously debated. At the time of its writing, the debate focused on what powers the clause might give Congress with respect to the economy, but some education scholars believe that the delegates to the Constitutional Convention saw it as a source of power for Congress to establish a national education system as well.

Stickney and Marcus (1984) argued that Madison's records of the Constitutional Convention "indicated that the framers of the Constitution clearly understood education to be included under Article 1, Section 8" and that "had James Madison's journal of the Constitutional Convention been made available prior to its publication in 1840, the educational politics may have developed differently" (p. 6). Stickney and Marcus failed, however, to cite any section of Madison's journals that contain this revelation, nor do they refer to it later. It seems possible that these scholars hold a somewhat anachronistic view of the Constitution, taking as rote what once was the subject of vociferous debate and painstaking compromise. Even the thought of a tacit understanding that the General Welfare clause contained within it the power to spend money to create a national school system is problematic, given the subsequent history of the clause's interpretation.

Eastman (1998) catalogued the famous Madison—Hamilton dispute over the meaning of the general welfare clause. On the one side, Madison and Jefferson argued that the Constitution was a document of *enumerated* and *limited* powers and that the general welfare clause was immediately modified by the following specific grants and therefore the clause carried no additional powers unto itself. As stated by Madison in his April 20 letter to James Robertson,

With respect to the words general welfare, I have always regarded them as qualified by the detail of powers connected with them. To take them in a literal and unlimited sense would be a metamorphosis of the Constitution into a character which there is a host of proofs was not contemplated by its creators. (Madison, 1867, p. 171)

On the other side of the debate was Alexander Hamilton, who argued in his 1791 *Report on Manufactures* (among other places), that the general welfare clause created *independent* Congressional power to spend money in support of virtually anything that Congress thought would benefit the general welfare. Hamilton did, of course, suppose some limits on this power, reserving it only for Congressional spending on truly national issues and problems, not merely local or state-targeted problems. Stickney and Marcus (1984), who argued that the general welfare clause was always meant to be the source of federal education powers, are clearly on Hamilton's side, citing a portion of his *Report* in which he stated that "there seems to be no room for a doubt that whatever concerns the general interests of *learning* [emphasis added], of agriculture, of manufactures, and of commerce, are within the sphere of the national councils, as far as regards an application of money" (Hamilton, 1961, p. 16).

Aside from the missing evidence of the Constitutional Convention's intent to give Congress power over schools (especially grammar schools; only "seminaries" and "universities" were mentioned), the fact remains that the few contemporary scholars who support Stickney and Marcus's interpretation rely on conflicting evidence. The main assumption is that Gouverneur Morris,

James Madison, and the rest of the convention knew that the power to create a national education system lay in the general welfare clause. Hamilton clearly supported this interpretation. But James Madison, the very man who repeatedly introduced motions to *explicitly* include education in the Constitution, just as clearly repudiated an interpretation of the general welfare clause that would have given Congress un-enumerated powers. This stance taken by Madison comports with his behavior, both in trying to introduce explicit constitutional provisions (otherwise the power would not exist) and later, as president, suggesting that a constitutional amendment might be needed in order to implement such a system.

It is perhaps ironic, then, that scholars trace the Elementary and Secondary Education Act, and its later reauthorization as No Child Left Behind, directly to the Congressional power contained in this clause. These acts are conditional grants of money, a Congressional power directly traceable to this "tax and spend" clause—an interpretation first legitimated by *United States v. Butler* (1936) and later in *South Dakota v. Dole* (1987).¹⁰ Whether the delegates to the Congressional Convention foresaw it or not, the federal government's increasing hand in education over the last 50 years finds its spring in this enigmatic and problematic constitutional clause.

WHITHER THE RIGHT TO EDUCATION: THE BILL OF RIGHTS

The other likely place that a federal role in education might be expected would be the Bill of Rights. Remember particularly that large sections of the Bill of Rights first appeared in, and were subsequently little altered from, the Northwest Ordinance in 1787, which also contained provisions for education. As a document, the Bill of Rights was one of the most radical reifications of natural rights the world had ever seen, having been influenced by the 1689 English Bill of Rights, the 1776 Virginia Declaration of Rights, and the French Declaration of the Rights of Man.

The Bill of Rights contains many fundamental rights cherished by the Founders. Education is conspicuously not among them. At the time, the delegates to the Constitutional Convention were concerned with brevity and the impending ratification fight, and the need to exclude extraneous powers from the text of the Constitution proper was certainly great. This was mitigated by the fact the delegates knew that a Bill of Rights would almost certainly be added retroactively, as several states had already demanded it as a condition of ratification. In light of its place within the Northwest Ordinance, education's absence from the Bill of Rights is thus somewhat of a mystery.

The historical record contains no smoking gun. No proposals were debated and no scraps of ideas like those apparent in the Constitutional Convention exist. However, two complementary theories offer possible explanations where the historical gap offers no help: (a) The Bill of Rights is primarily a *negative* document: It protects against governmental intrusions and deprivations and rarely, if ever, provides any positive rights, and (b) the Bill of Rights was based on a conception of *natural* rights, similar to the Virginia Declaration of Rights and the Declaration of the Rights of Man, and although a number of rights such as the freedom of speech, religion, and perhaps even the right to bear arms could be considered "natural" rights with which humans do not part as free and voluntary members of a society, the "right" to an education does not fit in such a scheme.

¹⁰*Butler* and *Dole* essentially legitimated the "federal dollars with strings attached" method of Congressional action, which became, along with laws ostensibly based in the Commerce Clause, one of the key models for federal legislation in the 20th century, including No Child Left Behind.

With a history of Monarchical encroachments fresh in mind, the founders created the Articles of Confederation, leaving the central government with very little power. After less than a decade of governance under such a system, these same statesmen, even those vociferously opposed to a federal government, realized that the Articles were largely nonfunctional and in need of reform. This article is no place to recount the massive struggles between the Federalists and Anti-Federalists,¹¹ but the Constitutional Convention and the Bill of Rights were a result of that tension. Although an oversimplification, the Constitution can be viewed in its simplest form as a representation of Federalist interests and the Bill of Rights as a representation of Anti-Federalist interests.

Thus, one would expect the Constitution to be the source of a national system of education, as this system would rely upon centralized power. On the other hand, although we now think of the Bill of Rights as a *source* of fundamental rights, for the Anti-Federalists, the Bill of Rights was a fundamental *limit* on the power of the Federal government. Thus simply on a structural level, the Bill of Rights was an unlikely place to *create* a new positive right that the government would grant its citizens.

Some founders, James Madison included, thought the Bill of Rights was repetitive and limiting. Given an understanding of the explanation just presented, the very structure of the Constitution prohibited the Federal government from acting beyond its scope. However, some delegates and representatives were unsatisfied with these limits and demanded a Bill of Rights that would enumerate the checks on the federal government with respect to the rights of the people. The rejoinder to this argument was that the people retained all their rights not given up to the Federal government. By listing some of the rights, and not including others, the list would limit what rights the government and courts recognized as remaining with the people. Regardless of these arguments, however, the Bill of Rights was ratified by the states and added to the Constitution. This fundamental check on the federal government's power may be thought of as a *source* of rights today, but its original intent was as a *limit* on power.

In addition to the aforementioned structural and limited government-based arguments, there remains the fact that the Bill of Rights was based on Enlightenment ideals of "natural" rights. The founders, when deciding which fundamental rights should be protected from governmental interference, examined primarily late-Renaissance and Enlightenment thinkers such as Locke, Rousseau, and Montesquieu, as well as documents such as the English Bill of Rights, the Virginia Declaration of Rights, and France's Declaration of the Rights of Man. These documents and thinkers enumerated the "natural" rights of man, which became a large basis for the Bill of Rights. These thinkers often thought about societal development in terms of a social contract progressing out of a state of nature.¹² Assuming that man had the natural right to do anything in the state of nature, they began to imagine what rights men might keep and which rights they might trade away when making the transition to civilization and society. Although the right to freedom of the press and religion are more practical than the theoretical and philosophical rights discussed by Enlightenment thinkers, the right to an education is the kind of "provided" right that

¹¹For an excellent discussion of this topic, see Storing and Dry's (1981) *What the Anti-Federalists Were For*.

¹²For examples of philosophers whom the Founders read who wrote about the state of nature, see, for example, *Leviathan* (Hobbes & Shapiro, 2010), *Two Treatises of Government* (Locke, 1988), and *The Social Contract* (Rousseau & Dunn, 2002).

does not fit in a schema of natural rights inherent to humanity. Thus, on a philosophical level as well as a structural level, the right to an education fails to fit into the Bill of Rights.

MODERN EDUCATION JURISPRUDENCE: SEARCHING FOR EDUCATION RIGHTS IN THE CONSTITUTION

The tension between the federal government and the various state governments was paramount during the 18th and 19th centuries, not only with respect to education but with respect to the Constitution as a whole. Although James Madison did argue that the first amendment should apply to the states, the Bill of Rights, as conceived and ratified, applied only to the federal government. In 1833, the Supreme Court decided *Barron v. Mayor and City Council of Baltimore* (1833). In this case, a man brought a Fifth Amendment claim against Baltimore's mayor and city council over dredging, which had interfered with his shipping business. In a somewhat perfunctory opinion ("the question thus presented is, we think, of great importance, but not of much difficulty"), the Court concluded that neither the Fifth Amendment nor any of the Bill of Rights applied to the states (*Barron*, 1833, pp. 247–251). The Court reasoned that elsewhere in the Constitution, rules applying to states were *explicit* and that the Framers were worried about *Federal* encroachment, not that of the states. Thus, on the basis of *Barron*, the Bill of Rights was stricken from application to the states, meaning that the prohibitions on establishment of religion, prohibitions on interference with free speech or the press, and the right to a jury trial simply did not apply to the states. States were free to establish and support particular religions (and some did¹³) and not offer jury trials in many cases. However, the history of rights jurisprudence changed after the passage of the Fourteenth Amendment in 1868.

After the passage of the Fourteenth Amendment, with its guarantees of "due process of law" and "equal protection of the laws," the Supreme Court began the process of "selective incorporation." Selective incorporation was the process by which the Court began to enforce the Bill of Rights against the states, not just the federal government. *Duncan v. Louisiana* (1968), a case deciding whether a defendant had a right to a jury trial in a battery case, gives an overview of the incorporation process. It explains that, in deciding what the "due process" that states must give actually means, the Court has increasingly looked to the Bill of Rights to give meaning to that due process (*Duncan*, 1968, pp. 147–148). Over the years, then, most of the provisions of the Bill of Rights (including, just recently, the Second Amendment) have been "selectively incorporated" into the due process clause of the Fourteenth Amendment, making those rights enforceable against states as well as the Federal government (*Duncan*, 1968, p. 148).

Despite their absence from the Constitution, education and education rights have been consistently litigated before the Supreme Court and have commanded great respect for many years. The history of education litigation, especially federal litigation, is littered with high-minded plaudits and laudatory phrases about the purposes and benefits of education in a democratic society. The Court has recognized the impact that education has on the welfare of persons, as well as the impact that education has on the economy, politics, and character of the United States. In *Plyler v. Doe* (1982), for example, the Court recognized that although education is not a fundamental

¹³For example, Congregationalism was Massachusetts' official, supported religion until 1833.

right (according to *Rodriguez*, discussed next), it is not “merely some governmental ‘benefit’ indistinguishable from other forms of social welfare legislation. Both the importance of education in maintaining our basic institutions, and the lasting impact of its deprivation on the life of the child, mark the distinction” (p. 221).¹⁴

It is surprising, then, that the Court’s ruling in *San Antonio Independent School District v. Rodriguez* (1973) is in such fundamental conflict with this history of praise. *Rodriguez* answered the question of whether, absent a specific provision in the Constitution, the Supreme Court would find a right to education in the Constitution. Rather straightforwardly, the Court ruled that “education . . . is not among the rights afforded explicit protection under our Federal Constitution,” nor is it “implicitly so protected” (*Rodriguez*, 1973, p. 35). Once and for all, the Court declined to find any positive right to education in the Constitution, either explicitly or implicitly. This despite the argument by the *Rodriguez* attorneys that a right to education could be implied from the first amendment rights of free speech and the associated right to receive information—a decision that had had been previously supported by the Court.¹⁵

Attorneys for *Rodriguez*, seeing that in at least one instance the first amendment had “impliedly” created a right, argued that, without education, the rights to speak, debate, and hear are empty. The Court understood that “right to speak is meaningless unless the speaker is capable of articulating his thoughts intelligently and persuasively” and that “the corollary right to receive information becomes little more than a hollow privilege when the recipient has not been taught to read, assimilate, and utilize available knowledge” (*Rodriguez*, 1973, p. 35). However, even in light of these arguments, the Court argued that it never had the “ability or authority to guarantee to the citizenry the most effective speech or the most informed electoral choice” (*Rodriguez*, 1973, p. 36).

Thus, *Rodriguez* dealt a crushing blow to those interested in establishing a fundamental right to an education. Even though the Court recognized the traditional nexus between education, citizenship, and stable democracy and agreed that First Amendment rights are essentially hollow without an education, it still declined to find a fundamental right to education in the Constitution. This ruling was not a terrible surprise, as it was consistent with the rulings on other cases argued before the Court during the same period, including the right to food, housing, healthcare, and so on.¹⁶ However, the mismatch between the Court’s recognition of the importance of education and its status under the Constitution remains noteworthy.

¹⁴The *Plyler* Court went on to quote other Courts’ gestures of respect for education. From *Meyer v. Nebraska* (1923): The “American people have always regarded education and [the] acquisition of knowledge as matters of supreme importance” (p. 400). From Brennan’s concurrence in *Abington School District v. Schempp* (1963, p. 230): “Public schools [are] a most vital civic institution for the preservation of a democratic system of government.” From *Wisconsin v. Yoder* (1972): “Some degree of education is necessary to prepare citizens to participate effectively and intelligently in our open political system if we are to preserve freedom and independence” (p. 221). Finally, from *Ambach v. Norwick* (1979): We recognize historic “perceptions of the public schools as inculcating fundamental values necessary to the maintenance of a democratic political system” (p. 77). Clearly, then, the Court has consistently expressed the utmost respect for the place of education in American life and does not doubt the crucial role it plays in sustaining democracy.

¹⁵The “right to receive” was found by the Court to be a “corollary” or “peripheral” right to the right to speak in, for example, *Lamont v. Postmaster General of U.S.* (1965, pp. 306–307), a case where the government was intercepting and destroying what it deemed foreign communist propaganda and requiring that citizens request in writing that the mail be delivered in order to stop the automatic confiscation/destruction. This restriction on the right to receive information was deemed to be offensive to the first amendment’s intent of a marketplace of ideas.

¹⁶See, for example, *Lindsey v. Normet*, 405 U.S. 56, 74 (1972) (holding there is “no constitutional guarantee of access to dwellings of a particular quality”).

The reasoning in *Rodriguez* is not airtight; it remains possible, though unlikely, that a future Court could exploit the small hole in *Rodriguez* to establish the beginnings of a fundamental right to education in the Constitution. Future interpretations are possible because, though the court declined to find a fundamental right to education, during its discussion of whether such a right is necessary for the exercise of First Amendment rights. The Court held that “even if it were conceded that some identifiable quantum of education is a constitutionally protected prerequisite to the meaningful exercise of either right,” Texas did not clearly fall short of that quantum in the education it offered (*Rodriguez*, 1973, p. 36). Although not directly admitting that some baseline level of education is protected as a corollary to the First Amendment, the Court potentially left open a small space for a future Court to do so.

“Some identifiable quantum” is a small peg on which to hang a hat. Reformers would likely require a situation in which a child was being *completely* denied an education before this theory would work. However, if such a case were found, the Court would likely strike down whatever law denied the child an education without the need for a constitutional right to education. Using so-called rational basis review, the Court would likely strike down the law as irrational or arbitrary, without needing to create fundamental new right. In fact, *Plyler v. Doe* (1982), litigated only a few short years after *Rodriguez*, represented just such a situation. At the time, Texas had a law under which undocumented children could be denied admission to schools. The Court ruled that noncitizens were still covered by the Fourteenth Amendment and that the law must further some rational objective of the state in order to stand. Abiding by the ruling in *Rodriguez* that education is not a fundamental right, the Court in *Plyler* found that the law failed rational basis review. It was thus struck down.

Thus, only a few years after *Rodriguez*, the Court declined the opportunity to declare a fundamental right to some baseline level of education, given the complete deprivation present in *Plyler*. We are now almost 40 years distant from *Rodriguez*, and it remains to be seen if the changing makeup of the Court will offer some hope to those wishing to find a fundamental right to education in the Constitution.¹⁷

CONCLUSION

Throughout the 20th century, Americans have been seeking education reform. With the introduction of the Elementary and Secondary Education Act, its later reauthorizations such as NCLB, and programs like Race to the Top, the Federal government has become more and more involved in education. However, this involvement comes without specific mention of education in the Constitution. The actual mechanics of federal involvement are grounded in conditional grants, which

¹⁷ Aside from attacking the ruling in *Rodriguez*, some reformers are creating new theories to argue that a fundamental right to education exists in the Constitution. One of the leaders of this type of thinking is Goodwin Liu, recently nominated for the Ninth Circuit Court of Appeals, only to withdraw once it became clear he would never be confirmed. His article “Education, Equality, and National Citizenship” argues that, as a result of the “citizenship clause” in the Fourteenth Amendment, U.S. citizens are vested with a “national citizenship,” which is the fount of many substantive rights, among them the right to a quality education (Liu, 2006). This idea of national citizenship deals directly with the problematic interstate inequality problems in the quality of education. Liu argued that the United States has a legislative tradition of using national citizenship as the grounding for numerous rights and that the idea of being a national citizen obligates the government to secure the equal opportunity across state lines for effective participation in our national government.

have been held constitutional, but the depth and breadth of Federal involvement in education demands a discussion of education's place in the Constitution. The debate still rages as to whether the federal government or the states have—or should have—the leading role in education.

The United States has a long history of intertwining education and government, be it at the local, state, or federal level. From the Puritans and the early New England colonies to the writings and legislation of some of our most famous leaders, the United States has focused on education in a widespread and pervasive manner. However, a plan or right to education does not exist within the Constitution or the Bill of Rights, despite being mentioned by several key documents that had come before. There can be no singular explanation without additional primary research. Even with this research, it is unlikely that a smoking gun exists. Some of the answer lies with state involvement in education; some more of the answer probably lies in the practical realities the delegates to the Convention faced. The Bill of Rights, as a protective document advocated by foes of Federal power was not likely to be the place for a new national right, though its position in our society and jurisprudence has shifted radically from then to now. Although several prominent thinkers and writers wrote about the idea of a national system of education contemporaneously with the Constitutional Convention and the ratification of the Bill of Rights, scholars and activists will no doubt continue to debate education's place within the framework of the federal government.

The history of education equity and adequacy litigation across the country shows that reformers are willing to use litigation strategically, given an opening with which to work. *Rodriguez* is susceptible to a somewhat open interpretation, and several scholars around the country are working on new theories to ground a fundamental right to education in the Constitution. Efforts such as these perpetuate the effort to ensconce education within the fundamental rights of the nation's citizenry. Because of this, the future of the debate over whether education belongs in the Constitution remains bright.

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Educational Equity Policies and the Centralization of American Public Education: The Case of Bilingual Education

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Sixty years ago, federal guidelines regarding the instruction of special populations in American public schools were nonexistent. Racial minorities, language minorities, women, the poor, and those with physical and mental disabilities had not been identified as groups that needed special protections. Much has changed since then. Federal legislation that is designed to ensure that all of these groups have access to equal educational opportunities in the United States is now in place. This article examines the evolution of policies surrounding bilingual education to illustrate that the need to ensure the educational opportunities of certain student populations compelled the federal government to become more involved in the governance and oversight of American public education. The implementation of such federal “protection policies” designed to expand educational opportunities for traditionally underserved groups of students ultimately fortified and solidified the federal government’s more pronounced role in public education.

Although education is never explicitly mentioned in the Constitution, public schooling has been a tradition in the United States since before the nation was formed. For many years, public education was seen primarily as a state and local issue, rather than a national one (Herrington & Fowler, 2003; Jennings, 2003; McGuinn, 2006). The federal government was more of a “junior partner” to state and local school governments that merely assisted in the financing and operation of public schools (Wirt & Kirst, 2005, p. 282). Policies driving school organization, funding, learning standards, curricula and staffing were designed and implemented at the state or local level. During the 1950s and 1960s, the tradition of state and local control in education was challenged as the federal government began to take a much broader and more pronounced role in developing policies that guide the education of elementary and secondary students in the United States, particularly regarding traditionally underserved students and those with special educational needs.

This article argues that federal involvement in education surged during the later half of the 20th century as courts embraced the principal that children should have equal access to educational resources, and Congressional legislation asserted that certain students require additional resources

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to compensate for inequalities among individuals (Yudof, 1973). It commences by tracing key policies, court cases, and legislation that illustrates the evolving role of the federal government in public education in the United States. Then, this article provides an exemplar of the increased federal role in education by examining the case of education of one group of traditionally underperforming students, English Language Learners (ELLs). To conclude, this article offers a discussion of how policies designed to improve the education of ELLs informs the larger debate surrounding centralization of public education.

EARLY FEDERAL INVOLVEMENT IN EDUCATION

Federal Government as a Source of Support

Until recently, Congress showed little impetus to pass legislation that affected special populations in elementary and secondary education. One exception was the Freedmen's Bureau, which was established by Congress in 1865 immediately following the Civil War to deal with the vast array of problems facing war refugees and recently emancipated slaves throughout the South. Creating primary and secondary schools for Black students and establishing normal schools in which to train African American school teachers were the primary goals of this group (Carleton, 2002). Despite existing for only 7 years, the lifespan of the Freedmen's Bureau resulted in the creation of thousands of schools that served more than 240,000 pupils (Pierce, 1971).

Another early example of the federal government becoming involved in public education in an effort to support special student populations is the National School Lunch Act. In 1946, Congress adopted this act to ensure that American children living in poverty would not suffer from malnourishment. Prior to the National School Lunch Act, charities, churches, and local organizations had made an effort to provide impoverished schoolchildren with at least one well-balanced meal each day. By approving this legislation, the federal government "involved itself in the broader social mission of education" (Carleton, 2002, p. 87).

Although these examples illustrate that the federal government has been involved in the education of special student populations for quite some time, it is important to note that in both examples the government played a peripheral supporting role and only provided financial support. The famous 1954 ruling on *Brown v. Board of Education of Topeka*, however, marked a shift in this policy, as the federal government transitioned from a supportive and peripheral role to a more pronounced and involved role that included generating new legislation designed to combat inequality in American public schools and ultimately enforcing compliance with these laws.

Brown v. Board of Education: Federal Government as a Standard Setter

In accordance with the *Plessy v. Ferguson* (1896) Supreme Court ruling, school districts in both the North and the South alike were able to open separate—and supposedly equal—schools for Black and White students. However, the Supreme Court's pivotal ruling in *Brown v. Board of Education* (1954) struck *Plessy* down. The Warren Court ruled unanimously against segregated schooling, underscoring that "separate educational facilities are inherently unequal" (*Brown v. Board of Education of Topeka*, 1954). In 1955, Chief Justice Warren enumerated the scope of the

relief and ordered that students be “admit[ted] to public schools on a racially nondiscriminatory basis with all deliberate speed” (*Brown v. Board of Education of Topeka*, 1954). Actually issuing a judicial mandate involving the way American public schools were structured and organized went well beyond the scope of the federal government’s previous level of oversight. The Court’s new interpretation of the Equal Protection Clause gave rise to a previously unknown level of federal judicial involvement in public education, which paved the way for increased educational influence in the executive and legislative branches as well.

The Civil Rights Act: Federal Government as Standard Enforcer

As a result of the original *Brown* ruling in 1954, the judicial branch of the government set new educational standards regarding the integration of schools. Despite these standards, the judicial branch did little to ensure that state and local education agencies complied with the ruling. Consequently, in the years following *Brown*, many states stalled and did not integrate their schools (Horowitz & Karst, 1969). This delay was in large part made possible by continued litigation at the district court level. However, the federal government’s role expanded in subsequent years with the advent of the legislation regarding civil rights.

The federal government accepted the burden of enforcing desegregation when in 1964 it passed the Civil Rights Act—this coming a full 10 years after the *Brown* decision. Title VI of this legislation explicitly states, “No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance” (Civil Rights Act, Title VI. § 601-02, 1964). Despite the fact that this act was a response to civil rights violations occurring in a wide variety of public spheres, schools were arguably the most affected. This piece of legislation paved the way for the federal government to enforce the *Brown* ruling.

Out of the Civil Rights Act emerged the Office for Civil Rights (OCR), an agency with the mission to ensure *compliance* with federal civil rights laws. The OCR was initially located within the Office of Education, part of the Department of Health, Education, and Welfare (HEW). Prior to the creation of the OCR, the primary responsibility of executing nationwide integration was left to the small staff of the Office of Education. Overnight, the Office of Education went from being a “powerless agency without any policymaking functions whose sole responsibility was to collect educational statistics and publish reports” to the key enforcer of a controversial new law that would affect millions of Americans (Yudof, Kirp, Levin, & Moran, 2002, p. 471). This sudden increase in the federal government’s role in education gave rise to the beginning of a period of centralization in American public education. Although the initial role of the federal government was to ensure nondiscriminatory treatment of all public school students regardless of race by ensuring equal access to educational resources, services, and facilities, the Civil Rights Act paved the way for the federal government’s involvement in education to become even more pronounced through legislation designed to compensate for inequalities between students.

Solidifying Federal Involvement: The Elementary and Secondary Education Act

President Lyndon Johnson’s Elementary and Secondary Education Act (ESEA) of 1965 was the first major piece of federal legislation directed solely at American public schools. It emphasized

supporting special populations, particularly students from low-income families. The key feature of ESEA was Title I, which even today continues to distribute additional funding to “provide financial assistance . . . to expand and improve . . . educational programs by various means . . . which contribute particularly to meeting the special educational needs of educationally deprived children” (Elementary and Secondary Education Act, 1965). For the remainder of the Johnson administration and during the Nixon, Ford, and Carter administrations, ESEA expanded to include other student groups with unique educational needs such as ELLs, migrant students, children with physical and mental disabilities, and delinquent and neglected children. The remainder of this article focuses specifically on the development, implementation, and expansion of one of the additions to ESEA, the Bilingual Education Act of 1968. This piece of legislation illustrates the amplification of federal oversight in education and the subsequent tug-of-war between the federal branches of government and the state education agencies.

THE BILINGUAL EDUCATION ACT

Following the approval of the Civil Rights Act, the courts began to define discrimination differently, choosing to focus instead on the effects of a policy rather than its intentions (Davies, 2007). Title VII of ESEA, otherwise known as the Bilingual Education Act, is a prime example of a policy that evolved as a result of this line of thinking. Title VII asserts that equal treatment does not necessarily result in equal results (Davies, 2007). Students with special educational needs, such as ELLs, required additional support to fully take advantage of a public education. ELLs are students whose difficulties in speaking, reading, writing, or understanding the English language may be sufficient to deny the ability to meet State’s proficient level of achievement on State assessments, the ability to successfully achieve in classrooms where the language of instruction is English, or the opportunity to participate fully in society (No Child Left Behind [NCLB] Title IX, Section 901(25), 2002).

The story of the Bilingual Education Act begins at the conclusion of the Johnson presidency. Initial support for this legislation came from Congress—Senator Ralph Yarborough, a democrat from Texas, authored the original act. Yarborough was interested in pushing this legislation through Congress for several reasons. Personally, he felt the need to mobilize support from the growing Mexican American contingency in his state in order to secure reelection for a third term in office (Davies, 2007). In addition, Yarborough believed that something needed to be done to remedy the poor academic performance of Spanish-speaking children not just in Texas but across the entire country. In the late 1960s, approximately 80% of Spanish-speaking children in the Lone Star state repeated first grade, and there were 12 times as many Mexican Americans in first grade as in 12th grade (Davies, 2007).

The Bilingual Education Act of 1968 had two purposes: to encourage states to recognize the special needs of ELLs and to provide financial assistance to local educational agencies that would allow them to design and implement new public school programs created to meet these special needs (San Miguel, 1985). It is interesting to note that Congress did not initially specify the particular approach that local agencies should use to instruct ELLs. This decision was left to states and local school districts; however, the name of the legislation suggests that the emphasis was clearly on instruction in two languages. This act “transformed bilingual education from a minor curricular innovation aimed at teaching English-only into a major reform aimed at introducing

the non-English languages of low-status groups into the public schools” (San Miguel, 1985, p. 506).

There are several reasons why Yarborough’s legislation was so widely supported. In the years following the historic *Brown* decision, the public became keenly aware of a number of social injustices taking place on American soil (Guthrie, 1981). Publications such as Michael Harrington’s (1962) *The Other America*, James Conant’s (1961) *Slums and Suburbs*, and James Coleman and colleagues’ (1966) *Equality of Educational Opportunity* (otherwise known as the *Coleman Report*) drew attention to the economic and educational disparities between Whites and racial minorities as well as between the middle class and the poor. As President Johnson declared “war on poverty” and made civil rights one of his major domestic priorities, the public had grown to favor social reform efforts such as the Bilingual Education Act, seeing such reforms as an effort to establish equality (Guthrie, 1981; San Miguel, 2004). Thus, at the time of its passage, the Bilingual Education Act was well received by both the public and Congress.

Despite general support for the Bilingual Education Act broadly, there were debates that occurred about the specific details of the legislation. One notable point of contention during the ratification process of the Bilingual Education Act was whether the act should include all language minorities or whether it should be restricted only to Spanish speakers, as Yarborough preferred (Davies, 2007). Ultimately, the legislation, which passed with widespread support in December 1967, included all language minorities. This decision immediately expanded the reach of the law. If the Bilingual Education Act had only included Spanish speakers, the impact of the law would have largely been contained to states considered traditional destinations for Hispanic immigrants, such as Texas and California. Instead, states across the country with very diverse ELL populations were included within the act’s reach.

President Johnson’s administration, though often classified as the “Equality Regime” (McGuinn, 2006), did not support the establishment of the Bilingual Education Act (San Miguel, 2004). The Office of Education felt that “the new program was redundant since bilingual programs were already permissible under ESEA,” and Secretary of HEW John Garner was not convinced that “a compensatory education measure should be couched in terms of civil rights” (Davies, 2007, pp. 143). In addition, President Johnson had been a teacher in south Texas during the height of English-only instruction and had actually administered corporal punishment to students who spoke Spanish while at school (Davies, 2007). Perhaps he felt strongly that English should serve as the only language of instruction in American public schools. Despite his personal opinion, Johnson signed the Bilingual Education Act into law at the end of his tumultuous 1968 presidential term. This was done to presumably avoid further scrutiny, but the bill received no funding in the year following its passage (San Miguel, 2004), and as time progressed, the scale of the legislation was severely limited, much to the chagrin of Yarborough, who referred to Johnson’s move as “tokenism” (Stein, as cited in Davies, 2007).

The Expansion of the Bilingual Education Act

The lack of funding limited the implementation of Title VII for several years. President Nixon increased financial support for the program, but not for altruistic reasons. He was interested in strengthening the Republican Party by winning over voting constituencies, particularly Latinos, for the 1972 election (Davies, 2007). From the moment the Nixon administration entered the

White House, it stressed the importance of bilingual education despite the administration's general dislike for the costly HEW Department (Davies, 2007). The Bilingual Education Act was the only substantial federal program directed specifically at Spanish speakers, and, as a result, it "assumed greater political importance than its modest appropriations might suggest . . . it symbolized the GOP's claim to care about Spanish speakers" (Davies, 2007, pp. 147).

The Nixon administration also took note of the mobilization of Latino activist groups (San Miguel, 2004). The Mexican American Legal Defense and Educational Fund (MALDEF), which was founded in 1968, became a powerful lobbying force during the Nixon presidency. Latino activists in California fought and won *Diana v. State Board of Education*, a case in which school districts were required to retest all ELLs who had been designated as "mentally retarded" in the students' native language because many of these students had received this designation simply as a result of their inability to understand the English tests (Davies, 2007). Mexican Americans had begun to gain political attention, and Nixon was interested in their vote. President Nixon's efforts to woo Latino voters paid off. Nixon secured one third of the Latino vote in the 1972 presidential election, which more than doubled the level of support he had received in the 1968 election (Davies, 2007).

In 1970, J. Stanley Pottinger became the new director of the OCR. Under his guidance and leadership, the issue of discrimination against language minority students was propelled to the forefront of its agenda. Pottinger (1970) submitted a memo addressed to "School Districts With More Than Five Percent National Origin-Minority Group Children," which was meant to "clarify D/HEW policy on issues concerning the responsibility of school districts to provide equal educational opportunity to national origin minority group children deficient in English language skills" (p. 1). He iterated several areas of concern in terms of school district compliance with Title VI of the Civil Rights Act, which outlaws discrimination on the basis of race, color, and national origin. The heart of the mandate was encapsulated in the first section, which stated,

Where inability to speak and understand the English language excludes a national-origin minority group children from effective participation in the education program offered by a school district, the district must take affirmative steps to rectify the language deficiency in order to open its instructional program to these students. (Pottinger, 1970, p. 1)

Second, the memo also prohibited that students be required to enter classes for the mentally retarded or be denied access to college preparatory courses as a result of limited English proficiency. Third, it stressed the importance of grouping language minority students in such a way as to best differentiate instruction based on the language skill needs of students but argued against the grouping or tracking of language minority children that intentionally results in an "educational dead-end" (Pottinger, 1970, p. 1). Last, the Pottinger memo sought to require that national-origin minority students' parents receive notification of all school activities, which "may have to be provided in a language other than English" (Pottinger, 1970, p. 1).

Gareth Davies (2007) called the impact of this memo "arresting" because it represented an unprecedented extension of federal influence on local schooling by exposing school districts that served more than 5% national-origin minority students to federal sanctions (p. 152). However, the Pottinger memo was not coupled with additional federal funding. At the time, the introduction of new bilingual education programs proved expensive—it required the hiring of qualified staff, development of new curricula, and purchase of new specialized teaching materials. School districts

were quick to note the lack of enforcement, and rather than scramble to comply with the new regulations, the vast majority of local education agencies simply ignored them.

Four years after the Pottinger memo, only 4% of school districts addressed by the memo had been reviewed for compliance with the requirements enumerated by Pottinger (Davies, 2007). Approximately half of those districts were found to be noncompliant, but on only one occasion did HEW attempt to enforce the regulations and cut federal funding (Davies, 2007). The result of this inaction was a lawsuit brought by MALDEF and other civil rights groups against HEW for neglecting to enforce Title VI of the Civil Rights Act (Halpern, as cited in Davies, 2007). Such discontent set the stage for larger scale litigation, ultimately increasing the pressure on the federal government to ensure compliance with this law.

The Involvement of the Judiciary in Expanding Bilingual Education

Two federal court cases led to a turning point in the enforcement of bilingual education programs. In 1970, the Justice Department sued the state of Texas, accusing the state of discriminating against both Mexican Americans and Blacks. The Fifth Circuit U.S Court of Appeals sided with the plaintiffs and ruled that Texas had to account for the unique needs of Latino ELLs in their desegregation plan in order to avoid violating the Fourteenth Amendment (Davies, 2007). Later the same year, lower federal court judge William Justice ordered that the state of Texas provide bilingual instruction that would recognize cultural diversity, rather than encourage linguistic and cultural assimilation (Skrentny, as cited in Davies, 2007). This ruling only affected the state of Texas, but the Supreme Court soon heard a case that would have nationwide repercussions.

In 1974, the Supreme Court heard *Lau v. Nichols*. A group of Chinese American parents whose children attended public schools in San Francisco united with antipoverty attorneys to sue the local school board, arguing that their children were being deprived of a fair and equal education because of the school district's refusal to offer bilingual education. They petitioned federal courts to provide English language instruction to approximately 3,000 Chinese students who were not proficient in English. Justice Department attorney Robert Bork argued,

Deny[ing] petitioners any assistance in learning the language of instruction in the schools excludes them from the educational program because of a national-origin related characteristic, just as effectively as would placing a policy of barring them from the school house. This unequal treatment . . . is a constitutionally impermissible act of de jure discrimination, from which petitioners are entitled to relief. (*Lau v. Nichols*, 1974)

The Court found that the San Francisco school system violated the HEW federal regulations:

Where inability to speak and understand the English language excludes national origin-minority group children from effective participation in the educational program offered by a school district, the district must take affirmative steps to rectify the language deficiency in order to open its instructional program to these students. (Pottinger, 1970)

The revisions also formally stated the importance of providing instruction in students' primary language as well as incorporating their cultural heritage into instruction (San Miguel, 1985).

Once HEW had judicial backing, the department began a more encompassing effort to ensure implementation and regulate states' bilingual education programs. One year after the *Lau* decision,

however, civil rights leaders and minority groups were still dissatisfied with the number of school districts that had embraced the *Lau* ruling and the Bilingual Education Act. In 1975, the OCR drafted the Lau Remedies, which outlined specific guidelines for teaching ELLs, including developing a procedure for identifying ELL students, assessing their English language proficiency, and stipulating that English as a Second Language instruction was not sufficient (San Miguel, 1985).

HEW released the Lau Remedies in 1975, which listed new requirements for testing and mandated that all language minority students have access to an unspecified type of language assistance program. This set of guidelines “translated schools’ legal obligations into pedagogical directives . . . resolving to prevent local districts from choosing the cheapest ‘band-aid’ treatments, such as remedial English classes” (Crawford, 1996). After the Lau Remedies, districts could not implement bilingual education voluntarily. Rather, they were required to design extensive English acquisition programs if the district contained 20 or more language minority students. Districts were also obligated to take proactive steps to address the needs of ELL students even if the district contained only one language minority student. Districts had to take this action in order to comply with the federal mandate and escape the jeopardy of losing federal funding (Teitelbaum & Hiller, 1979). The nature of the original Bilingual Education Act of 1968 had thus by this time been radically transformed.

Unfortunately, the effect of the Lau Remedies was curtailed by the fact that the Federal Register never printed the plan. This omission negated the Remedies’s legal standing. Nonetheless, the OCR did make a greater effort to ensure compliance. In 1975, 333 districts in 26 states were asked to submit a plan explaining what they would do in 1 year’s time to comply with the Lau Remedies. If the plans were unsatisfactory, the OCR had the power to reject them and mandate a bilingual education program (Davies, 2007). Schools that did not comply were subject to reductions in funding. These increased regulations often prompted school districts to contend with a difficult decision: spend the money on implementing expensive bilingual education programs (often for multiple language groups) or risk being sanctioned by the OCR. A number of school districts chose to comply with the regulation; 5 years after the Lau Remedies, the OCR had been able to review 600 school districts and negotiate 359 plans (Davies, 2007), and ultimately, the Lau Remedies prompted the development of plans to serve language minority students in 500 school districts across the country (Crawford, 1994).

In addition to the Lau Remedies, judges in New Mexico and New York delivered additional rulings that strengthened the federal government’s role in the implementation of bilingual education programs. In *Serna v. Portales* (1974), the judge found that “bilingual education was the only appropriate remedy for the discrimination that Mexican Americans in New Mexico had experienced” (Davies, 2007). The *Aspira v. New York* (1974) case resulted in a guarantee that Puerto Rican children in the New York City School District would have access to bilingual instruction. Such federal court cases served as warning signs to other out-of-compliance states—states such as California, Texas, Michigan, Colorado, New Jersey, and Illinois, all of which were among those states that repealed English-only laws during this time period and permitted (but did not necessarily encourage) bilingual instruction (Davies, 2007).

As educational programs for ELLs gained more attention from the Department of Education, Congress, and courts across the country, the Bilingual Education Act was reauthorized and federal appropriations for bilingual education increased to \$68 million, but this amount was still relatively trivial considering the multitude of students entitled to language support services. Simultaneously,

the “cultural maintenance” aspects of bilingual education programs began to come under increased scrutiny (Davies, 2007, p. 162). This may have contributed to the beginning of the decline of bilingual education.

Increased Criticism of the Bilingual Education Act

Critics of bilingual education began to gain momentum as the reauthorization of the Bilingual Education Act approached in 1978. The American Institute for Research evaluated 38 bilingual programs and found that less than 30% of students placed in bilingual education were actually ELLs, and that 86% of bilingual education programs actually kept children in bilingual education long after they should have been mainstreamed into regular classrooms. In addition, they found that bilingual education programs cost an average of \$376 more per student than regular programs and that there was no evidence that bilingual programs were having a positive impact on ELLs’ achievement (Danoff, 1978). Another critical report, published by well-known *Washington Post* journalist Noel Epstein (1977), claimed that the half billion dollars spent on bilingual education since the inception of the Bilingual Education Act was a waste of money because “the government has not demonstrated whether such instruction makes much difference in the students’ achievement, in their acquisition of English, or in their attitudes towards school” (p. 1). When the Bilingual Education Act was reauthorized in 1978 it reflected these criticisms by stressing the importance of gaining English proficiency rather than the importance of including ELLs’ primary language in classroom instruction.

Increased questions surrounding the effectiveness of bilingual education programs gave rise to the English-only movement, which demanded that ELLs be provided language instruction only in English. The Lau Remedies had been unpopular with many local school boards, and the Reagan administration chose to redact them just before they were due to be formalized. This returned the right to determine how to address the needs of ELLs to school districts. Monitoring of school districts was thus significantly curtailed, and little was done to ensure that schools were in compliance with *Lau v. Nichols* (Crawford, 1996). During a time in which immigration increased tremendously, federal funding for bilingual education decreased from \$158 million to \$133 million. Although the number of ELLs continued to rise, the number of students actually served dropped from 300,000 in 1978 to 182,000 in 1984 (San Miguel, 2004).

Simultaneously several reports were published by the Department of Education that were highly critical of bilingual education, particularly of the system developed in Texas (Inspector General, 1982). The Secretary of Education, William Bennett (1985), spoke in favor of English-only methods of ELL instruction and harshly criticized bilingual methods, stating, “After seventeen years of federal investment and after \$1.7 billion of federal funding, we have no evidence that the children whom we sought to help . . . have benefited” (p. 361).

The debate settled somewhat during the early 1990s as president Bill Clinton reauthorized the fifth and final version of the Bilingual Education Act in 1994 as part of the Improving America’s Schools Act. This reauthorization reaffirmed the use of ELLs’ native language as part of instruction through bilingual education programs. However, in the same year, another wave of initiatives against bilingual education took place across the country. After having little success in Congress, opponents took their fight to the state level, in the process pushing back against the more centralized role of the federal government in education.

States Fight to Reclaim Educational Territory

Between 1998 and 2002, three states with significant ELL populations voted to outlaw bilingual education for their students and allow English-only instruction. California voters passed Proposition 227, which effectively ended bilingual education in their state. Two years later, Arizona voters echoed their neighbors in California by outlawing bilingual education. Finally, Massachusetts, one of the first states to permit bilingual education in 1971, voted in favor of Question 2, which defined ELL education as English-only instruction. Of interest, Colorado had a similar initiative, but the Colorado Supreme Court intervened, stating, “The titles and summary fail to note that the initiative provides that ‘no school or school district shall be required to offer a bilingual education program.’ . . . Voters could erroneously believe that school boards retain their authority to require bilingual programs in addition to English immersion” (Supreme Court, State of Colorado, 2000). However, the measure was later revised and resubmitted and was defeated by 55% of voters on the same day as Massachusetts voters approved Question 2.

Redefining the Federal Role in Education

When Congress reauthorized ESEA in 2002 as NCLB, they replaced the Bilingual Education Act (Title VII of ESEA) with Title III of NCLB, which was entitled “Language Instruction for Limited English Proficient Students.” Whereas Title III singles out ELLs as a group that must be carefully tracked due to their at-risk status, it neither recommends nor disapproves of bilingual education. In fact, the only requirement Title III makes in terms of the type of program districts implement is that the program must be “based on scientifically based research on teaching limited English proficient children, that the [state] agencies believe to be the most effective for teaching English” (NCLB, 2002). However, a careful inspection of the legislation reveals the administration’s clear preference for English-only programs. The removal of the word “bilingual” from Title III suggests that the administration sought to deemphasize the native language aspect of the Bilingual Education Act.

Despite the lack of a formal mandate for bilingual education, the federal government is arguably more involved in monitoring, evaluating, and regulating the instruction of ELLs than ever before. NCLB requires that all school districts receiving federal funds submit an annual report that describes the English language instruction program, the progress that ELLs have made in attaining English proficiency during the course of the academic year, and the number and percentage of students who have exited ELL status because they have demonstrated English proficiency by the end of the year.

DISCUSSION: BILINGUAL EDUCATION AND CENTRALIZATION

The case of bilingual education illustrates several broader themes in the trajectory of federal involvement in American public schools. First, much of the expanded role of the federal government in education is driven by the goal to promote educational excellence and equity for all students, particularly those who have been underserved by American public schools. This trend

is evidenced by key reports and legislation such as the National Commission on Excellence in Education's *A Nation at Risk* (1983) and the articulation of goals for students throughout the United States in *Goals 2000* and NCLB. All of these efforts have centered on improving the academic achievement of underperforming groups (such as ELLs) through active reform and restructuring initiatives.

Another theme that emerges is that whereas the federal government's role and voice in American public education has arguably become more pronounced, the rate of centralization is not constant. Educational centralization seems to go through periods of rapid expansion, as bilingual education did immediately following the Lau Remedies in 1975, and sudden decline, as was evident when the Reagan administration chose to deemphasize bilingual education. Often it seems that the availability of federal funding (or the threat of the withdrawal of monetary support) is aligned with the level of educational centralization. For example, rather than challenge the Bilingual Education Act, the Reagan administration chose to deemphasize federal involvement in public education by pushing through nontrivial budget cuts to the bilingual education budget, whereas the George W. Bush administration chose to employ access to federal funding as a policy lever to ensure compliance with NCLB statutes.

In addition, when federal regulation begins to dominate the educational policy landscape, states often react and reassert themselves as the primary agency governing education. States have reacted to the lack of consensus surrounding bilingual education by creating their own policies either outlawing bilingual education altogether (e.g., California, Arizona, and Massachusetts) or mandating it for certain segments of the ELL student population (e.g., Texas). These state-driven efforts often stem the movement toward centralization by checking the federal government and allowing state governments to reclaim (or appear to reclaim) some of their decision-making power.

Finally, it is important to note that although it is evident that federal involvement in education has grown exponentially since the mid-1900s, this does not imply that the role of state and local education agencies has diminished. In fact, most agencies have assumed a greater level of responsibility by responding to new federal pressures and new legislation emerging from Washington. This has spurred states to develop their own instructional programs, assessment and accountability systems, and teacher certification procedures. In essence, the shifting federal role has resulted in a flurry of activity at all levels of educational governance.

The evolution of the Bilingual Education Act reveals a continuing trend toward centralization in American educational governance. The basis for this rapid expansion of the federal role is largely rooted in the Equal Protection Clause of the Fourteenth Amendment and the Civil Rights Act, which as initially interpreted in *Brown v. Board* requires that all students have access to equal educational opportunity. However, the Bilingual Education Act is one of several federal "protection policies" that illustrates that much of the increased federal role in education is not only due to the need to provide compensatory programs to help underperforming students improve by providing them with additional resources and supports. This agenda has gained traction across the political spectrum; liberals were the primary driving force behind legislation surrounding bilingual education, but conservatives embraced this increased federal role as well through legislation such as NCLB. Keen public interest in education and a negative public perception of public education has allowed this surprising level of tolerance for federal involvement to persist. These conditions have over time led to a steady increase in the centralization of public education in the United States.

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The Centralizing Role of Terminology: A Consideration of *Achievement Gap*, *NCLB*, and *School Turnaround*

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American educational policies over the last 40 years have represented an uninterrupted movement toward centralization. This article analyzes three terms that have become critical to the centralization of American education. More specifically, this article reviews the development, language, and source of the thematic terms and associated language of *achievement gap*, *NCLB*, and *school turnaround*. The author contends that the level of each term's entrenchment in American education varies but that their impacts have all grown from a top-down initiative, and although the terms represent separate concepts, they have been linked in meaningful ways to drive centralization.

INTRODUCTION

Beginning with the civil rights movement in general and the Elementary and Secondary Education Act (ESEA) specifically, American educational policies over the last 40 years have represented a long-term movement toward centralization (Uzzell, 2005). Documents such as *A Nation at Risk* and standards and accountability movements have increasingly influenced and possibly narrowed the focus of American education. The No Child Left Behind (NCLB) Act represents, arguably, the culmination of this movement, and the repercussions of the legislation in terms of centralization appear to be ongoing as school choice, teacher pay reform, and school turnaround have been directly influenced by the legislation. Surprisingly, little attention has been given to the specifics of the language most critical in the development of a more centralized American system of education, especially given the importance that recognizable language plays in developing a common understanding (Fairclough, 2001; Gee, 2006).

This article critically analyzes three terms that have become critical to the centralization of American education over the last 40 to 50 years. More specifically, this article reviews the development, language, and source of the thematic terms and associated language of *achievement gap*, *NCLB*, and *school turnaround*. These terms were selected for three reasons. First, they span the last half century of American education, with achievement gap emerging in the late 1960s/early 1970s, NCLB at the turn of the century, and school turnaround in the last few years. Second, an impetus for the relevancy of each term is easily (if naively) identifiable: The civil rights movement and ESEA both led to the identification of achievement gaps; achievement differences

by subgroups measured via local and state testing became federally mandated as NCLB; and assessment data are used to determine schools in need of turnaround. Third, each term and the subsequent movements behind each term are now clearly interrelated. The achievement gap is interwoven throughout NCLB policy and is at the heart of the school turnaround movement. The criteria for School Improvement Grant (SIG) funding are lifted straight from NCLB requirements, definitions, and sanctions. For these reasons, *achievement gap*, *NCLB*, and *school turnaround* are worth further consideration as terms illustrative of a march toward increased centralization.

Achievement Gap

According to the North Carolina Department of Public Instruction (2000),

the achievement of minority students represents a long-standing issue in the field of education. Across the U.S., white students and students from wealthy, well-educated families have consistently outperformed students from most other ethnic backgrounds and students from impoverished families on virtually every indicator of academic achievement in the host of studies that have addressed this issue. The term “achievement gap” is often used to refer to this phenomenon. (p. 4)

Despite relatively more recent local and national attention (Miller, 1995), the creation of the term *achievement gap* is at least a century in the making. Neither inequality in American education nor the achievement differences between groups of American students is a new phenomenon. Although the achievement gap is currently one of the most measured and considered educational progress characteristics for students, teachers, schools, school districts, and states, it is a relatively recently derived term for a long-standing issue: observable differences in educational outcomes between at least two groups of students.

Emergence of the Term

The legislation and monies from the Civil Rights Act and ESEA of 1965 imposed significant desegregation plans on schools throughout the nation, especially in the South. “In a broad sense, the civil rights and Great Society movements directed interest toward disparities in learning opportunities and outcomes for minority and low-income youngsters” (Murphy, 2009, p. 4), which particularly emphasized public schools as the institutions crucial to the prospects for African American students. ESEA primarily provided funding for the improvement of educational programs intended for economically disadvantaged students (Allington & McGill-Franzen, 2000). President Johnson adopted an approach to federally fund excessively poor school communities with dollars targeted to particular categories of need. In accordance with the precedent of the “War on Poverty” in the previous year, Title I was established with federal aid earmarked especially for the education of poor and/or disadvantaged students, along with other categorical programs, such as supplemental education centers and library book dissemination initiatives (Jennings, 2001). These targeted funds were aligned with the growing national effort to “prevent poverty from restricting schools’ opportunities and academic achievement” (Tyack & Cuban, 1995, p. 27).

As part of President Johnson’s effort to provide equal educational resources and opportunities to disadvantaged students, a team of researchers led by sociologist James Coleman and colleagues

(1966) raised the concern that family and peer influences could explain a greater proportion of the variance in student achievement than the school attended. The research team's analysis based on student racial differences more formally introduced educators, researchers, and policymakers to the concept of an achievement gap. However, the term was not used directly by the ESEA legislation or the Coleman research team. Although the Coleman report did not coin the term *achievement gap*, it did introduce the idea of a gap in multiple places. Specifically, in their comparison of group achievement scores in Chapter 3, the authors recognized a gap in the following statements:

It appears that in some areas of the country there are experiences over the period of school that serve to widen the gap in achievement between Negroes and whites—while there are in none of the regions experiences that decrease the difference over the period of school. (Coleman et al., 1966, p. 220)

Individual students in some systems may have an opportunity to overcome the handicap with which they begin; but if so, that opportunity is not widespread enough to reduce the gap that exists between them and the white majority. (Coleman et al., 1966, pp. 273)

Perhaps as a clever play on words or simply an editing necessity, major print media outlets, such as the *New York Times* (Herbers, 1966) and the *Washington Post* (Grant, 1966) relayed the findings to the public in terms of an achievement gap.

The National Assessment of Educational Progress (NAEP) further legitimated the emergence of the idea of an achievement gap. By generating a nationally representative sample of students and testing them on basic skills in subjects traditionally believed to be the most important in public education, NAEP surfaced as “the Nation’s Report Card.” For the first time, an assessment that compared groups of students on a national scale had arrived. In 1983, the National Commission on Excellence in Education released *A Nation at Risk*, which disparaged American public education for its poor student performance. In the years immediately following this report, an “excellence” movement that seldom addressed racial inequality specifically but increased accountability collectively emerged (Orfield & Eaton, 1996). Social, political, and economic pressures again required change, and this time the states responded by developing accountability systems that demanded increased student achievement and began to account for achievement gaps, among other things. One hallmark of many of the state accountability systems was a formal requirement that school and district ratings be based—at least partly—on major racial and economic groups passing state tests—groups of students “who had been overlooked in the past” (Toenjes, Dworkin, Lorence, & Hill, 2002, p. 110).

Even as early as 1995, education researchers such as David Tyack and Larry Cuban could envision a distinctly federal feel around the state accountability movement: “*National* goals and curriculum standards, presumably to be followed by some form of national assessments, are to be coupled with school site management of the learning process” (p. 81). According to Chubb and Loveless (2002), NCLB, a reauthorization of ESEA, introduced “federal teeth” that had never been seen before. The reauthorization was designed to promote equity by requiring that schools report disaggregated test scores annually, “allowing for the monitoring of progress by each major ethnic and racial group” (p. 6). NCLB has been the most explicit federal effort to close achievement gaps in the history of American education. In fact, the term *achievement gap(s)* occurs 13 times in the NCLB legislation, including the opening:

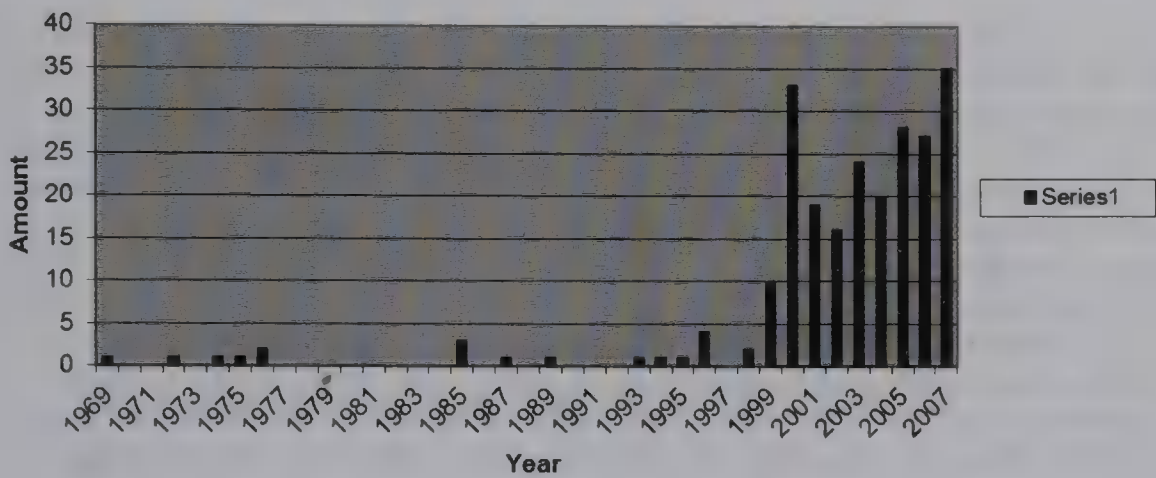


FIGURE 1 Frequency of achievement gap references in the *New York Times*.

An Act:
To close the *achievement gap* [emphasis added] with accountability, flexibility, and choice, so that no child is left behind. (NCLB, 115 STAT. 1425, 2002)

Tracking Achievement Gaps

One rudimentary way to measure the prevalence of a word or a phrase is to track its use in national newspapers such as the *Washington Post* and the *New York Times*. The headlines and stories in these papers are often representative of national interests, and the word choices used within them can create commonality in language across states and communities. In a basic search of the term *achievement gap*¹ in ProQuest Historical Newspapers, the preponderance of *New York Times* articles between 1851 and 2004 clearly indicated that the term *achievement gap* appeared in conjunction with the emergence of state and national accountability measures, with the first hit relevant to racial disparity in education appearing in 1966 (see Figure 1).

The same search of the *Washington Post* revealed three brief articles published prior to 1966 before an account of the Coleman report and its findings (Herbers, 1966). After this early mention, the achievement gap continued to appear infrequently until the late 1990s, when state accountability systems had become somewhat entrenched (e.g., Berger, 1999). As discussion of a national assessment system entered the presidential debate, references to achievement gap picked up even more in 1999 and 2000 (e.g., Marks, 2000; Rosenbaum, 2000). With President George W. Bush’s signing of NCLB into law in early 2002, a considerable spike in the use of the term was evident from 2001 to 2004 (e.g., Hartocollis, 2002).

¹The search for newspaper references to achievement gap was conducted via ProQuest Historical Newspapers with the term *achievement gap* in quotation marks. The term *achievement gap* could appear anywhere in the article. Only newspaper articles were considered, which could include editorials. The search of newspapers focused primarily on the *Washington Post* and the *New York Times* for their historical place and national impact. ProQuest’s search engine provided results only through 1994 for the *Washington Post*, however. Thus, the focus of newspaper-related discussion is on the results of the search of the *New York Times*.

In addition, an increase in nationally renowned education scholars writing op-ed pieces for the *New York Times* emphasized the growing importance of the achievement gap. Education scholar and author of *Class and Schools: Using Social, Economic, and Educational Reform to Close the Black-White Achievement Gap* Richard Rothstein contributed to the *New York Times* as an education columnist in the early 2000s. From November 2001 through April 2003, he wrote at least four columns that considered the achievement gap (Rothstein, 2001a, 2001b, 2002, 2003). In October 2000, Pulitzer Prize-winning journalist Jim Yardley (2000a, 2000b) spent consecutive weeks considering the Texas model for addressing the achievement gap. Another example is education historian Diane Ravitch’s discussion in January 2001 of President George W. Bush’s educational plan, which would become NCLB.

A search of the term *achievement gap* anywhere in the text of *Education Week*’s archives yielded 826 articles between 1982 and 2008. The distribution of the articles (see Figure 2) is very similar to that seen in the *New York Times*. Not surprisingly, because *Education Week* was not launched until late 1981, the first article that referenced the achievement gap appeared in 1982. All the references to achievement gap during the 1980s are contained in only 18 articles, a number matched in 1999 alone and surpassed by each single publication year thereafter.

Of interest, there appear to be three surges in achievement gap articles during the 26-year span (1982–2007) illustrated in Figure 2 that seem to coincide with major centralizing movements of accountability. From 1997 to 1999, there were double-digit recordings of articles addressing the achievement gap each year, an amount not reached in any year prior. During this time, state accountability systems had become more of the norm rather than the exception, which could at least partially explain this growth. As the presidential debates of 2000 pervaded the public conscious and the nation experienced the reenactment of ESEA in the form of NCLB, an even steeper climb in achievement gap articles appeared with at least 40 articles referencing the gap in the years 2000 to 2003. Finally, as NCLB sanctions became a reality for schools and school districts not meeting standards, 70 to nearly 100 articles referenced the achievement gap each year from 2004 to 2007.

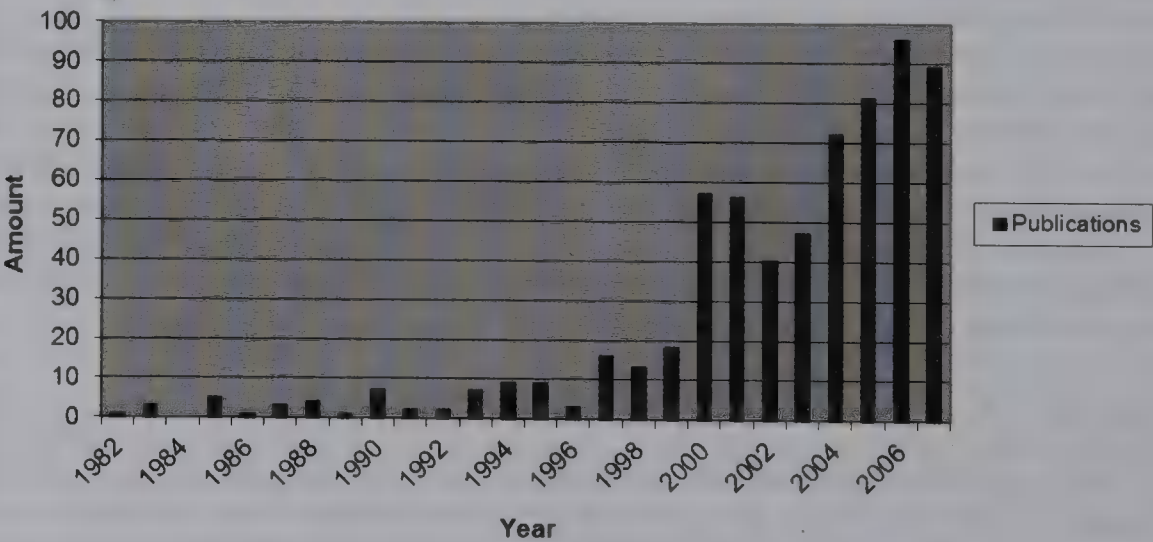


FIGURE 2 Frequency of achievement gap references in *Education Week*.

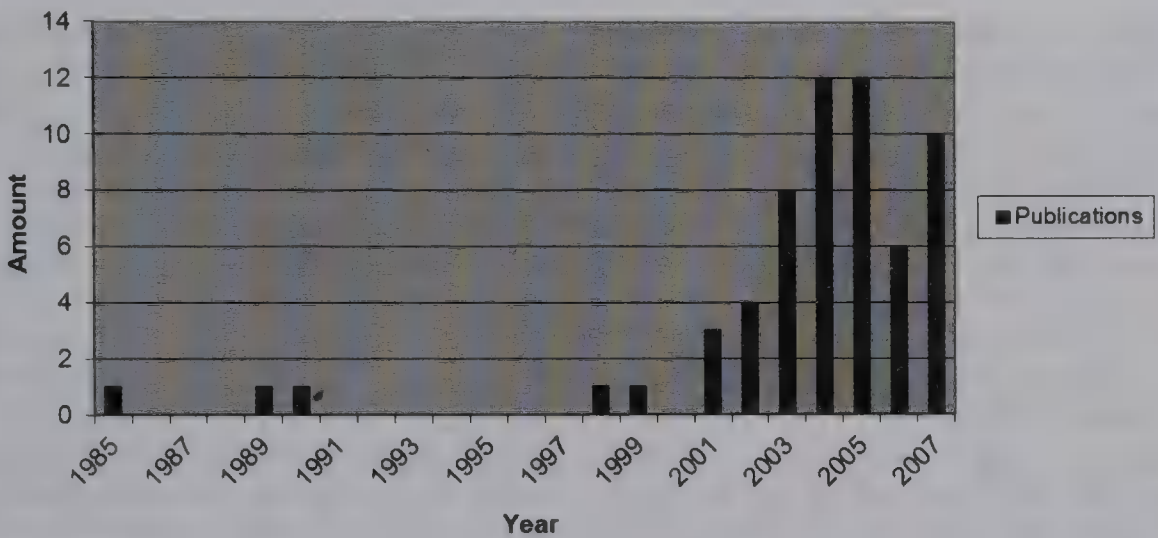


FIGURE 3 Frequency of achievement gap references in *Phi Delta Kappan*.

Published since 1915, *Phi Delta Kappan*, which is a professional education journal that addresses policy and other educational issues monthly during the academic year (September–June), addresses topics at all levels of education while advocating research-based school reform. Discovering a similar trend in the use of achievement gap within *Phi Delta Kappan* is important for at least two reasons. As an education journal, *Phi Delta Kappan* serves as a confirmatory tool on the *Education Week* data. Moreover, its role as a journal is important because it legitimizes educational research and issues through its reporting and discussion of them while promoting continued interest in those same research areas and educational issues through dissemination. The results of the basic achievement gap search in *Phi Delta Kappan* are in Figure 3. An investigation of research journal articles and scholarly books showed similar trends.

The current conceptualization of the achievement gap has been over a century in the making. The term appears to be a journalistic by-product of educational research that was conducted in response to ESEA of 1965. After 30 years of infrequent use, at least in various education print sources, more centralized efforts to measure student achievement by subgroups have led to an increase in the documented use of the term. The most recent reauthorization of ESEA (NCLB) included the term *achievement gap* multiple times, even presenting the closing of achievement gaps as the most central tenet of the mandate.

The emphasis of the term *achievement gap* through placement and repetition in legislation as well as the sanctions that accompany a school or school district's inability to satisfy the demands of NCLB have been critical in substantiating the term as a centralizing force in education policy. Not surprisingly, the sea of change accompanying NCLB legislation has resulted in widespread adoption of achievement gap language. The National Center for Education Statistics continues to administer and analyze NAEP, allowing for achievement gap monitoring on national, state, and local levels. "Closing the achievement gap" is one of the education issues identified by the Education Commission of the States (n.d.), a national organization committed to providing "tools and resources for state policymakers to develop effective policy and practices in education."

In 2002, the Illinois State Board of Education released a bulletin on NCLB, identifying "closing the achievement gap" and "addressing educator quality" as the two strands of NCLB that school

districts and schools would necessarily use to demonstrate compliance (p. 1). State-prepared documents and reports such as the state of Washington's *A Plan to Close the Achievement Gap for African American Students* (Office of the Superintendent of Public Instruction, 2008) have become standard operating procedure. The emphasis on understanding and tracking the achievement gap has been extended to state websites, such as the Instructional Equity/Closing the Achievement Gap page on the Kentucky Department of Education's (n.d.) website.² Moreover, school and district comprehensive improvement plans identify achievement gaps as challenges to overcome.³

The speed at which achievement gap has come to pervade education policy, relevant conversation, and material at national, state, and local levels is remarkable. A term seldom used from 1940 until nearly 2000 has grown into one of the most unavoidable terms in American education. Its place now appears to be firmly entrenched. Although achievement gap is a term that will continue on in education policy analysis and discussion regardless of political churn, its establishment as a by-product of the act that originally emphasized it cannot be overstated.

NO CHILD LEFT BEHIND

ESEA of 1965 was designed to increase state and school district focus on services for traditionally underserved groups of students. The operationalization of ESEA required significant changes throughout the public education system in priorities and organizational behavior, but actual change was inconsistent and unevenly enforced (McDonnell, 2005), resulting in limited significant changes in student achievement (Terry, 2010). More recently, the passage of the Improving America's Schools Act (IASA) of 1994 mandated standards-based reform, increasing the role of federal policy in public education (Goertz, 2005). The Improving America's Schools Act was created to spur accountability systems that would increase student achievement across schools regardless of their Title I status. However, not even half of the 50 states had a single accountability system in place by 2000–01 (Goertz, 2005). Moreover, the states varied in their expectations of schools regarding the percentage of student proficiency, timelines for meeting performance goals, and measures of improvement over time. In short, before the act's passage, no state had a system in place that met all the provisions of NCLB (Goertz, 2005).

Foundations

Although technically a reauthorization of ESEA, NCLB "marked a significant shift in federal education policy, with heavy emphasis on increased accountability, eliminating the achievement gap, and expanded school choice" (Fusarelli, 2005, p. 120). NCLB was designed, in part, to address the variability (Goertz, 2005) and the slowness (McDonnell, 2005) in state policy adoption that developed under the Improving America's Schools Act. Through NCLB, the federal

²See <http://www.education.ky.gov/kde/instructional+resources/closing+the+gap>.

³For an example of a Kentucky Department of Education audit, see <http://www.education.ky.gov/nr/rdonlyres/3e1b0434-544d-421b-99dd-12c4d8bdec47/0/centralhardinhighschool.pdf>. For an example of a school improvement plan, see <http://www.fcps.net/media/42222/tatescreek10.pdf>.

government significantly expanded its role, requiring among other things that all states annually assess students in Grades 3 through 8, set ambitious and uniform improvement goals for their schools, and prescribe sanctions for schools that failed to meet these goals (Goertz, 2005).

NCLB “inaugurated what many now see as ‘an unprecedented level of federal involvement’ in public education” (Pugmire, as cited in Fusarelli, 2005, p. 120). Perhaps the most significant change in the federal regulation of public schooling in 30 years (Hardy, 2002), NCLB has been described as “the most sweeping [intrusion] into state and local control of education in the history of the United States” (Cook, 2004, p. 8). Because the federal role is no longer limited to Title I schools, current federally mandated requirements link schools and teachers to achieving a nationally specified rate of progress on state assessments, essentially shaping curriculum and instruction within classrooms (Wong, 2008). In other words, “federal NCLB performance-based expectations apply to all students in all schools” (Wong, 2008, p. S178).

NCLB has clearly produced a “fundamental realignment of power and authority within the educational system in the United States” (Fusarelli, 2005, p. 132). The phrase *no child left behind* has become recognizable throughout mainstream America (Amrein-Beardsley, 2009), and the particulars of the mandate have necessarily become commonplace within school districts and schools. If NCLB were to become as impactful as envisioned by its creators, however, district and school practitioners would need to understand its requirements. Given that NCLB is more than 1,000 pages of legislation, familiarity with the cardinal terms or aspects of the bill have often been condensed to a few words and definitions. The following is a brief demonstration of the widespread adoption of a few key elements of NCLB, including annual measureable objectives (AMOs), adequate yearly progress (AYP), subgroups, highly qualified teachers, and corrective actions. The point here is not to weigh the merits of NCLB but to sufficiently point out how significantly accountability has shifted. Just over a decade ago, less than one half of U.S. states had state-level systems of accountability in place. Now all states—including their school districts and schools—are speaking a remarkably similar language under the federally established umbrella of NCLB.

Key Elements

Annual Measureable Objectives

Schools and local education agencies (LEAs) are required to meet a set of AMOs to ensure that progress is being made toward the ultimate objective of 100% of students reaching proficiency by 2013–14. This process begins at the state level, as statewide AMOs are set for the percentage of students expected to be proficient in English language arts and mathematics. Although NCLB specifies the framework for what is required, the states establish AMOs and the necessary increases in student proficiency to reach 100% proficiency. In addition, the states must determine AMOs for other success indicators (Mills, 2008). For example, Virginia’s *Consolidated State Application Amended Accountability Workbook* (Virginia Board of Education, 2011) indicates in its opening letter to the U.S. Department of Education’s Assistant Secretary for Elementary and Secondary Education that the workbook reflects AMOs consistent with the statutory requirements found in the reauthorization of ESEA. Within the body of the workbook, the Virginia Board of

Education establishes that AMOs for reading and language arts, mathematics, graduation rate, and attendance (with science, history, and writing appended recently) be determined for all years through 2013–14 in accordance with NCLB. Formulas used to determine the state AMOs necessitate annual LEA and school goals that must be met for the state to reach its annual goals. The Virginia Department of Education website makes the connection between state and local AMOs explicit, with links to “School, Division, and State Report Cards.” A web page devoted to explaining school report cards defines what AMOs are and provides example benchmarks over time.⁴ AMOs for reading and mathematics are identified clearly on each school report card.⁵

Adequate Yearly Progress

NCLB requires that the states develop a timeline in which all students, regardless of their demographics, will demonstrate proficiency in English language arts and mathematics by 2013–14. School and district success is determined yearly by whether or not student populations and each subgroup population meet annual objectives (Mills, 2008). AYP is essentially the progress made in reaching AMOs. Because AYP is so closely tied to AMOs, the presentation of each is often given together. Returning to the Virginia document and websites discussed previously, a definition of AYP and an illustration of it (in conjunction with the one for AMOs) is clearly relayed on the state website accountability guide for school report cards. Each school report card also states whether a school district or a school “Made AYP” or “Did Not Make AYP.” The pervasiveness of AYP in the education system appears to extend well beyond state reporting, however, and into district and school dialogue. A quick online search reveals a bevy of documents related to AYP at the district level, including district reports to states,⁶ links to questions-and-answers pages,⁷ a one-page explanation of terms,⁸ and checklists for district and school personnel.⁹

Subgroups

Performance data must be disaggregated according to different student subgroups, such as gender, race/ethnicity, poverty, special needs, and English learners (Smith, 2005). AYP is considered by subgroup if at least a minimum number of students for a particular subgroup are enrolled in a grade at a school. Therefore, much of the presentation of AYP at least touches on the identification of subgroups and reporting on them. The previously mentioned report card system in Virginia, for example, separately specifies student achievement levels for each subgroup.

⁴See http://www.doe.virginia.gov/statistics_reports/school_report_card/accountability_guide.shtml.

⁵See <https://p1pe.doe.virginia.gov/reportcard/>.

⁶See <http://www.cherryhill.k12.nj.us/curriculum/nclb/1AYP%20Separate%20report%20for%20reference.pdf>.

⁷See <http://nclb.dpsk12.org/progress>.

⁸See http://www.asdk12.org/depts/assess_eval/AYP/AYP_ExplainsStatus.pdf.

⁹See <http://www.dpi.state.nd.us/title1/targeted/general/reauthoriz/AYPdistrictinfo.pdf>.

Highly Qualified Teachers

NCLB requires that state implementation plans ensure that teachers of core academic subjects be highly qualified, which means being fully certified by the state most often by holding at least a bachelor's degree and passing a test demonstrating subject matter knowledge (Moloney, 2006). The state of Washington's Office of Superintendent of Public Instruction has a page devoted to forms and documents related to highly qualified teachers,¹⁰ including requirements and guidelines, worksheets and individualized planning for status attainment, procedures for teachers not yet highly qualified, parent right-to-know letters and request forms, and district accountability improvement and financial plans. The Oklahoma State Department of Education provides a similar page,¹¹ with links to highly qualified definitions, requirements, a corrective-action memorandum, frequently asked questions, and teacher checklists, in addition to teacher and principal site log-ins, sample identification worksheets for principals, and applications for teachers. This information, similar to that for AMOs and AYP, has been distilled to highlights and rubrics for district and school personnel.¹²

Corrective Actions

Mills (2008) clearly explained corrective actions as follows:

If a school does not meet one of its AMOs for 2 consecutive years and thus does not demonstrate AYP, it moves into what is called program improvement (PI) status (NCLB, 2001, sect. 1116). During year 1 of PI, which is at the beginning of the third year following 2 years of not making AYP, schools must offer to parents, at LEA expense, transportation to another school in the district that has demonstrated AYP. Year 1 PI schools are entitled to technical assistance to address the issues that led to failure to demonstrate AYP. Using this technical assistance, schools should develop or revise 2-year school-improvement plans, incorporating research-based strategies among other things. In year 2 of PI, schools continue to receive technical assistance as well as offer supplemental educational services to students from low-income families. In PI year 3, LEAs are required to take corrective action, which might consist of replacing staff, implementing a new scientifically based curriculum, or imposing some other type of reorganization. In PI year 4, LEAs must develop a plan that may involve replacing staff, reopening the school as a charter school, or any other major restructuring. In year 5, the alternative governance plan developed in year 4 must be implemented. (p. 14)

Similar to the other terms highlighted earlier, state websites explain corrective action for school districts, schools, and communities. State report cards indicate whether or not school districts and schools are in corrective action, and, if they are, the year of corrective action. School districts list their schools in corrective action and their corresponding stages.

The terms highlighted here are just some of the concepts most associated with and understood through the context of NCLB. The legislation of NCLB has become widely known throughout

¹⁰See <http://www.k12.wa.us/titleiia/highlyqualifiedteachers.aspx>.

¹¹See <http://sde.state.ok.us/Teacher/HighlyQualified/default.html>.

¹²See, for example, the Carrollton-Farmers Branch Highly Qualified Teacher Plan, which clearly outlines campus goals, action strategies, measures, and timelines to attain the goal of all teachers being highly qualified. See <http://tinyurl.com/74k4ytt>

the public school system, and the vocabulary of the legislation captures the essence of the bill throughout the states and across educational roles. Although states ranging in size and location—from California to Georgia to Rhode Island—might have varying AMOs and different ways to determine AYP, state, district, and school personnel understand the terms and from where they originate. Indeed, struggling school districts and schools across the country have become very familiar with the steps of corrective action. Moreover, these terms extend beyond schools into all levels of public school education governance. Research shows that various personnel, at a minimum, maintain a working knowledge of NCLB and related terminology, including governors (Fusarelli, 2005), state policymakers (Wanker & Christie, 2005), mayors (Wong, 2008), district personnel (Terry, 2010), school boards (Crum & Hellman, 2009), principals (Gardiner, Canfield-Davis, & Anderson, 2009; Sunderman, Kim, & Orfield, 2005), and teachers (Goldstein & Beutel, 2007; Moloney, 2006).

SCHOOL TURNAROUND

The topic of school turnaround has become prominent in national education discourse. The U.S. Department of Education (2009), independent researchers (Fullan, 2006; Meyers & Murphy, 2008), and practitioners (Wolk, 1998) have all recently called for drastic improvement in the academic performance of schools. The American Educational Research Association provided one example of the extent to which focus has shifted to school turnaround, renaming its “Comprehensive School Reform” special interest group “School Turnaround and Restructuring.” What turnaround currently means in the context of schools is evolving, however; as just 5 years ago, the term represented a concept. Today, it is discussed more often as a model of improvement. Of interest, federal influences have furthered both interpretations.

Turnaround as a Concept

Conceptual (Fullan, 2006) and synthetic (Murphy & Meyers, 2008) work began to create a space for the idea of school turnaround, an idea that, in its simplest form, suggests that a chronically failing school could still demonstrate rapid and significant improvement. Murphy and Meyers (2008), for example, provided general guidance regarding the causes of school failure and options for reorganization. Acknowledging the lack of research on the identification of schools requiring turnaround, the authors drew on common lessons, such as mission statements and continuous improvement monitoring from the organizational literature, for reversing organizational performance in a short amount of time.

Some recent research suggests that this view of school turnaround has support. For example, researchers evaluating comprehensive school reform conducted an exploratory study of changes in school-level achievement among grantee schools (U.S. Department of Education, 2010). They found that certain broad categories of reform that have been identified within the school reform literature (e.g., new leadership styles and instructional strategies) were indeed associated with positive outcomes. However, the authors stressed that the details of these reforms varied widely across schools, and, consequently, it was difficult to draw conclusions about the “one best system” for turning schools around. More recently, Stuit (2010) investigated the success rates of charter

and traditional public schools in eliminating chronically underperforming schools “via dramatic turnarounds in performance and/or shutdowns” (p. 10). Stuit concluded that turnaround work is currently a “dismal state of affairs” (p. 10), as only 1% of schools across sectors demonstrated turnaround (defined as increasing school proficiency rates to at least the 50th percentile within a state) within a 5-year period.

School turnaround has quickly become a federal priority. The federally funded guide *Turning Around Chronically Low-Performing Schools* (Herman et al., 2008) highlights several case studies of schools that have successfully “turned around” to offer recommendations for school and district leaders. Although the authors acknowledged that the research base for their recommendations was “weak,” the goal of communicating the concept of school turnaround to practitioners is clear. In addition to the report, the Doing What Works website,¹³ sponsored by the Department of Education, has the goal of “creating an online library of resources to assist teachers, schools, districts, states and technical assistance providers implement research-based instructional practice” and maintains a subsection of “Data-Driven Improvement,” also titled “Turning Around Chronically Low-Performing Schools.” This guide serves as the foundational piece to the website, which also includes both research and practitioner video clips. A federal effort suggesting to struggling schools how to raise themselves up from failure quickly is central to both the guide and the website.

Turnaround as a Model

Although turnaround, as a term, has been considered only in research and policy contexts in relation to schools and schooling for the last 5 to 10 years, recent federal initiatives focused on the subject have considerably altered the landscape by amplifying the attention given to the school turnaround effort. In a commentary published by *Education Week* in June 2009, Secretary of Education Arne Duncan indicated that “turnarounds should be the first option for low-performing schools” (p. 36). In making turnarounds an option, Duncan shifted the conversation from turnaround as a concept to turnaround as a model or a strategy. He further explained his position:

In Chicago, the most successful interventions we implemented when I led the city’s school system were complete turnarounds. We moved adults out of the building, kept the children there, and brought in new adults. It was the best and fastest way to create a new school culture, one in which student achievement was the primary goal. (p. 36)

Despite the attention given to school turnaround, school and district leaders who are attempting to implement a turnaround model have limited information on best practices. In the Chicago Public Schools, school reform efforts that resemble school turnaround efforts have been advanced for more than a decade (de la Torre et al., 2012). Since 1997, Chicago Public Schools has initiated no fewer than five reform initiatives (some coinciding with impending NCLB sanctions) in which substantial changes were made in leadership, staff, and/or governance in an attempt to produce rapid, dramatic changes in chronically low-performing schools. No rigorous research has been conducted yet on the Chicago Public Schools reform schools, but that model of school

¹³See <http://dww.ed.gov/>.

turnaround has become a trademark of the Obama administration's education agenda. By defining and promoting four strategies or models that involve "dramatic change, including fundamental, comprehensive changes in leadership, staffing, and governance" (State Fiscal Stabilization Fund Program: Final Rule, 2009, p. 58462), current Department of Education high-profile grant competitions (e.g., Race to the Top) and the \$3.5 billion in Title I SIGs require grantees to implement one of these models: turnaround, restart, closure, or transformation.

SIG Award Process

As noted earlier, a national emphasis has been placed on turning around the country's lowest performing schools by using one of the school turnaround models. Moreover, the U.S. Department of Education (2010) recently expanded funding for the SIG initiative, with the stated goal of rapidly improving the nation's 5,000 lowest performing schools. SIG funding comes from section 1003(g) of ESEA. State education agencies are eligible to receive SIG funding, with the requirements that 95% of the funds be allocated directly to LEAs. SIG funds specifically target the lowest achieving 5% of schools in the nation, with the goal of moving schools from improvement status to meeting AYP.

The SIG application requires state education agencies to describe a number of processes that include monitoring and reviewing the ability of LEAs to implement reforms with SIG funds. States are required to outline specific information regarding the applications that LEAs would be required to complete, including a needs analysis of Tier I and Tier II schools, the LEA's capacity to use SIG funds to support the selected intervention, and an LEA provisional budget demonstrating its ability to adequately fund the intervention. Last, the application requires that states describe a plan to evaluate LEAs with regard to the implementation of the intervention, the choices of external providers, the practices and policies that allow for implementation, and the plans for sustaining the intervention once SIG funding ceases. The initiative and the funding attached has had an impact across the country at the state level, as all 50 states and the District of Columbia applied for and were awarded SIG funds.¹⁴

In considering only the Midwest states (Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin), the number of school districts with schools eligible to compete for funding in 2010 ranged from one in Wisconsin to more than 350 in Ohio. Five of the seven states had more than 100 such districts. In Ohio, schools in more than 200 districts applied for SIG funding. Because SIG applications are submitted by school districts, this suggests that a considerable number of school district personnel are aware of and continue to participate in this federal competition. Moreover, school administrators and potentially other personnel participate in the process by taking part in the application submission. At least 14 schools in each Midwestern state have been part of the SIG applications. As part of the application process, each school must indicate which of the four turnaround models (turnaround, restart, closure, or transformation) it would enact if awarded funds. Now in its 3rd year of competition, the federally funded SIG program continues to focus around the term *turnaround* and the use and understanding of the four models of improvement.

¹⁴See <http://www2.ed.gov/programs/sif/index.html>.

The emergence of school turnaround as an educational issue at the national level has been swift. Since the summer of 2009, *Education Week* has published more than 40 reports and briefs that highlight school turnaround (e.g., Gewertz, 2009a, 2009b). More removed but just as pervasive, several consulting, research, and other organizations have emerged in the last two years to assist school districts and schools with turnaround (Stuit, 2010). The issue has become well known at state and district levels throughout the nation, as nontrivial federal funding (e.g., SIGs) has been tied to providing programs that will rapidly increase student achievement. States and school districts have responded accordingly, as all 50 states and the District of Columbia have applied for and have been granted SIG funding (U.S. Department of Education, 2010), which demonstrates state and LEA awareness and familiarity with the movement. Moreover, there is evidence that some school administrations are aware of school turnaround initiatives, as individual schools must determine what type of turnaround model they will employ if they are to receive SIG (or other) funding.

CONCLUSION

Each of the three broad terms just discussed—achievement gap, NCLB, and school turnaround—have, to varying degrees, become recognizable across the American education landscape. Although the level of each term's entrenchment in American education varies, their spread has occurred because of top-down initiatives. The terms are now recognizable individually and are frequently considered in isolation in terms of policy discussion, research analyses, and achievement projections. The issues are, however, clearly related. Although racial equity concerns and civil rights spurred the Coleman research study, the Coleman study in turn spurred the coining of the term *achievement gap*. As a continuation of the civil rights-based ESEA, NCLB emphasized closing achievement gaps, including racial achievement differences. Similarly, school turnaround emphasizes the rapid improvement of chronically underperforming schools, of which a preponderance are located in central cities and enroll high percentages of impoverished and minority students. Although the terms are individually identifiable, the interrelatedness of these terms appears central to their increased recognition.

Moreover, the impact of the terms and what they represent is perhaps increased by the shared purpose that they seem to project. Achievement differences by race as researched by Coleman and colleagues were clearly a significant finding with long-term influence, but pervasive conceptualization of an achievement gap did not begin to materialize until the emergence of state accountability systems. The passage of NCLB and its consistent regard for closing achievement gaps appears to have perpetuated the drastic use of the term in media and elsewhere (e.g., states, school districts, and schools). Concurrently, the development of common terminology such as achievement gap has made the problem that it represents public knowledge, spurring increased federal involvement. In other words, the identification of a representative term seems to have made an important issue even more prominent in the public domain. The use of the term not only identifies a problem but also acts as a rallying point.

Similarly, increased accountability in the form of NCLB and a growing recognition of uneven student achievement by race, poverty, and other factors directly influenced the development of turnaround language and policy. The specific components of NCLB, such as AMOs, AYP, and subgroups, have made the identification of failing schools in need of turnaround a simpler and

more formal task than in years prior to the legislation. To consider the current school turnaround dialogue a response, at least in part, to achievement gaps (racial, economic, and otherwise) appears to be a logical step to make. In sum, the awareness of differences in achievement by race, or achievement gaps, seems to have been formalized through NCLB legislation and language, paving the way for intensive efforts to improve student learning through school turnaround models.

The terminology that emerged from NCLB and school turnaround has become pervasive. State, district, and school personnel are familiar with achievement gap, AYP, and the corrective action language that stems directly from NCLB. School turnaround language, specifically models of turnaround such as transformation, are much newer to the education system, and the extent to which school personnel beyond administrators identify and understand this term is unclear. Still, it is clear that national competitions for significant funding, including Race to the Top and SIGs, are allowing state and district personnel to become familiar with the growing school turnaround movement. Although each state defines AYP or determines how a school is eligible for SIG funding, all of the differences across the states remain within the parameters set by a national definition. In other words, district personnel from states as diverse as Maine, Texas, and Hawaii, where accountability and funding opportunities might differ significantly, can still easily communicate about NCLB mandates and school turnaround funding opportunities.

The cohesiveness of language across the states contributes greatly to the determination of national educational goals. This is evident in the utilization of *achievement gap*, *NCLB*, and *school turnaround* and their associated terms on a national scale. The federal push to incorporate these interrelated terms across the country has been integral to the current centralization movement in the American public school system.

AUTHOR BIO

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Control of Teacher Certification in the United States

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Teacher certification trends in the United States since World War II paint a complicated picture of powerful interests at different levels making demands and trying to institute disparate reforms. These patterns have varied over time, often because of teacher supply and demand. The federal government initiated its involvement when education professionals' competence came under attack in the years following the launch of Sputnik. The tensions over the size and scope of state and federal control that characterize many areas of American policy are crucial in education. The current policy environment in the United States involves several seemingly contradictory components and adversarial actors. As the United States attempts to reform its education system in response to the ever-increasing demands of participation in the global economy, control of teacher preparation and certification will continue to have to respond to multiple stakeholders.

INTRODUCTION

Teacher education in the United States has long had a complicated relationship with structures of governmental power and control. Local, state, and federal roles in teacher training and certification have been inconsistent throughout the nation's history. Angus (2001) suggested that issues of teacher training and certification have always revolved around the central question of who should control these processes: education professionals, government, or public agencies. As the United States Department of Education has just begun to issue waivers allowing states to opt out of the No Child Left Behind Act's requirements (U.S. Department of Education, 2012), it is clear that the question of who controls public education is still very much under debate. Teacher certification is one of the many parts of education that has been subject to changes in centralized control, especially since World War II. Governments, education professionals, the business community, and the public all make different demands on education, resulting in a system of teacher certification that reflects a patchwork of interests and power brokers. A cyclical pattern of increased and decreased teacher supply, along with centralization and decentralization of certification requirements, has characterized American education through much of the middle to late 20th century (see, e.g., Angus, 2001; Bales, 2006; Lucas, 1999). Similar changes have occurred in the role played by education professionals, who were once primary forces in national debates about certification but have largely become secondary players in the conversation.

TEACHER CERTIFICATION HISTORY

Authority over teacher training and certification in early America was scattered across multiple levels of government, with most of the power in the hands of local districts. Urban and rural school systems had different ways of training teachers, and the power to make decisions about certification requirements also varied extensively. Local politicians made certification decisions in some areas of the country; elsewhere, the local clergymen were given the responsibility of selecting and training teachers. By the late 1930s, however, the administrative progressive movement had largely wrested control from cities and towns and placed it in the hands of organized educational bureaucracies working under state governments (Tyack & Cuban, 1997). Progressives at the time believed that the only way to ensure teacher quality was to require ever-increasing lengths of formal training controlled by state bureaucracies (Angus, 2001). Reacting to the oversupply of teachers during the Great Depression, many states began to increase their standards for certification. In 1937, 41 states had systems where certificates were issued by only the state, a powerful step toward the centralization of teacher certification (Angus, 2001).

Starting during World War II, however, and continuing in the decades that followed, teacher supplies decreased to levels less than demands. After the war, the United States suffered the greatest teacher shortage in the nation's history, as many teachers left the classroom for higher paying jobs related to the war (Angus, 2001). The number of emergency certificates issued by states rose from 2,305 in 1940–41 to 69,423 in just 2 years, and by the end of the war topped out at 108,932 (Angus, 2001). The vast increase in demand for teachers placed pressure on states to lessen their expectations for teacher training and certification (Darling-Hammond, 1999). One result of this action by the states was a lessening of previous requirements for teachers, which may have led to an overall drop in teacher quality. Because there were so few teacher candidates, states could not require that districts hire only those with excellent credentials.

In the 1960s and 1970s, states experienced dramatic increases in student enrollment, which further contributed to the teacher shortage. Due to the baby boom, American K-12 student enrollment went from 26 million in 1950 to 46 million in 1972 (Grissmer, 2000). By the 1980s, however, this trend had changed again, with fewer children in school and more young people attending teacher education programs. These changes led to a shift back toward an oversupply of teachers, which in turn allowed for stricter credentials. States took back control of certification and hiring as the teacher shortage crisis passed and applications for teaching returned to their prewar levels. By the end of the 1980s, almost all states had similar requirements for teaching: In all but a few, teachers had to have proof of an average of 30 undergraduate or graduate credits from a state-approved teacher education institution, 12 to 15 weeks of student teaching experience, a major or minor in their subject area, and high-enough test scores in basic skills as well as subject matter and/or pedagogical techniques. These requirements were significantly more stringent than those that had existed during the previous 40 years (Darling-Hammond, 1999).

This oversupply of teaching candidates continued into the early 1990s when, again, both the media and academia reported a national teacher shortage. At the time, experts believed that this shortage was a simple question of supply, but deeper analysis later revealed that the problem was in fact an issue of staffing. Fewer and fewer certified teachers proved willing to take open teaching positions, particularly in high-needs schools and in the areas of math, science, and special education (Steinberg, 1999).

REFORMS AND REFORMERS

Several reform initiatives in the postwar period, including federal legislative actions, moved American education toward a more centralized governance structure. Certification and teacher preparation, however, were absent from many of these bills; in fact, the issue of teacher preparation and quality is relatively new to the educational improvement debate. Because of its legislative underrepresentation, it is important to study the few instances that teacher preparation and quality do appear. What follows is a review of the major laws, state-level reforms, and third-party actors that have influenced education in the United States since the end of World War II.

National Defense Education Act of 1958

When the Soviet Union first launched its satellite, Sputnik, into space in October 1957 (Jorden, 1957), the United States, concerned that this proved it was falling behind in a global technological race, passed the National Defense Education Act of 1958. This act sought to elevate America's ability to defend itself against Communism through technological innovation accomplished at the hands of American students better prepared in math and science. The bill provided funding for math and science programs for American schoolchildren in the hopes of creating innovative thinkers who would advance America's standing in the arms and technology race. Unfortunately, the bill featured no provisions that dealt with teacher quality or credentials. The funding structure provided a move toward the centralization of math and science achievement goals and introduced the federal government into education policymaking (Bales, 2006), but the bill had no effect on centralizing teacher training or quality assurance.

Elementary and Secondary Education Act of 1965

Part of Lyndon Johnson's Great Society program in the 1960s involved the passage of the Elementary and Secondary Education Act of 1965 (ESEA), which broadened the federal role in public education (Robelen, 2005). Although federal funding never exceeded 10% of school systems' budgets, the federal presence was nonetheless quite large (Cibulka, 1990). Although this bill allowed for national-level comparisons between students in schools through the creation of the National Assessment of Educational Progress, it did not propose using these data to compare teachers' effectiveness or to judge the quality of their preparation (National Center for Education Statistics, 2008). In this way, ESEA, like the National Defense Education Act, did not have a centralizing effect on teacher certification or attempts to govern teacher quality, though it did move educational governance as a whole much closer to central control.

A Nation at Risk (1983)

In its famous report of 1983, *A Nation at Risk: The Imperative for Educational Reform*, the National Commission on Excellence in Education (NCEE) fostered the idea that the United States had fallen far behind its peer countries in public education, in the process introducing

the idea that American schools were “failing” (NCEE, 1983). This report, written during the Reagan administration, called for higher standards and better education for the nation’s children. It also noted that “not enough of the academically able students are being attracted to teaching” and “teacher preparation programs need substantial improvement” (NCEE, 1983). This was the first instance of teacher training and certification joining the national conversation about the improvement of public education in the United States, and is perhaps the impetus for the antiteacher sentiment that characterizes much of school reform debate even today.

Although it did not call for specific programs to improve teacher preparation or hiring (NCEE, 1983), *A Nation at Risk* was pioneering in that it suggested that teacher quality had a direct impact on student outcomes. One of the explanations the report offered for American students’ low achievement was that “not enough of the academically able students are being attracted to teaching . . . teacher preparation programs need substantial improvement . . . [and] a serious shortage of teachers exists in key fields” (NCEE, 1983, p. 20). The key idea that teacher quality could be held responsible for student test outcomes encouraged lawmakers to control this quality at more and more centralized levels. Both the federal government and professional teacher organizations responded to the call, and have since participated in attempts to standardize teacher certification, but their motivations could not have been more different. In the 1980s, teachers’ unions understood that teaching, never fully recognized as a bona fide profession in the United States (Murray & Fallon, 1989), was under unprecedented attack in the era following *A Nation at Risk*. Their efforts to offer strengthened certification opportunities can be seen as an attempt to protect the image of teachers (Tom, 2000). The federal government, however, began its efforts to centralize the certification process in an effort to attract a different pool of teacher applicants altogether.

National Board Certification & American Board Certification

Shortly after *A Nation at Risk* was released, a call came for centralization of teacher quality measures from an unexpected source: the teacher’s union movement. Ostensibly to help bolster the flagging image of teachers, then-president of the American Federation of Teachers Albert Shanker released a statement supporting the establishment of a set of national teacher standards, which led to the creation of the National Board for Professional Teaching Standards in 1987. The mission of this board was to advance the quality of teaching and learning by establishing high standards, providing voluntary certification, and advocating for quality pedagogy (National Board for Professional Teaching Standards, 2008), all with the assumed purpose of assuring the public that its teachers were qualified professionals. To this end, the board established National Board Certification, a professional certification process through which veteran teachers could prove their skills and knowledge and receive nationally accepted recognition. The application process requires applicants to have taught for at least 3 years, hold state certification, pay a \$2,300 fee, make video and portfolio submissions, and take written tests. In 1994, the first cohort of teachers was certified in this way (National Board for Professional Teaching Standards, 2008).

Although this voluntary certification has not been widely adopted—fewer than 2% of teachers nationwide are National Board Certified—98% of those holders surveyed said that certification has had a positive impact on their careers. Ninety-four percent of those surveyed also reported positive impacts on their students’ learning, whereas 92% stated that they planned to renew

their certification when it expired (National Board for Professional Teaching Standards, 2007). National Board Standards are also used “in some way” by 500 of the 1,200 teacher education institutions in the United States (National Board for Professional Teaching Standards, 2007), and though many contest the extent to which the National Council for the Accreditation of Teacher Education (NCATE) represent the views of the teacher education community, the organization supports these standards as well (NCATE, 2008).

National Board Certification, though not a federal program per se, represents one step closer to the centralization of teacher training and preparation, and its roots can be seen in another, related certification initiative: The American Board for Certification of Teacher Excellence. Established in 2001 by the federal government, this board provides certification for teachers entering the profession (as opposed to National Board Certification, which is intended for experienced teachers) and requires a lower fee (\$500) as well as “self-guided test preparation” and testing requirements in place of the observations and written portfolio submissions of the National Board process (Glazerman & Tuttle, 2006). Although this certification is supposed to allow teachers to travel between states, eliminating some of the burden of state-specific teacher certification requirements, it is currently recognized by only seven states, some of which impose additional requirements on educators wishing to teach bearing only this credential (Glazerman & Tuttle, 2006).

The national teacher certification process’ general failure seems to demonstrate that states still wish to maintain control over their own processes of choosing teachers. It may also indicate that teachers and teacher candidates are unwilling or unable to invest the time and money required to earn national credentials when localized credentials fulfill much the same purpose. It is also possible that other problems have affected the extent of adoption of these certifications, particularly National Board Certification. One analysis states that the process is plagued by “lack of agreement on criteria for assessing teacher performance, slender evidentiary basis for assessment, the board’s inability to authenticate or verify the accuracy of the materials received, [and] secrecy surrounding the board’s assessments” and concludes that “board certification is an expensive process based on limited information of uncertain authenticity” (Ballou, 2003).

America 2000 and Goals 2000

Following *A Nation At Risk* in 1983 and the establishment of the National Board for Professional Teaching Standards in 1987, two more steps—this time coming from the federal government—increased the centralization of education decisions in the United States. Following the National Governors’ Association summit in 1989, Congress passed President George H.W. Bush’s America 2000: An Education Strategy, which was the first national education proposal that introduced the idea of holding schools accountable for student performance by using their scores on standardized tests. It also laid the groundwork for the alternative certification boom that would come in the next decade, and did so by encouraging funding for new routes to the classroom for talented would-be educators.

America 2000 heavily influenced legislation, passed under President Clinton, called Goals 2000: The Educate America Act, in 1994. This act called for standards-based education reform and was the first national law to establish a basis for comparing schools in different states. Although there were no specific teacher preparation requirements in the bill, it did begin the accountability movement that has characterized recent education reforms. Passed together with

a reauthorization of Title I of ESEA, this law was seen as “a revolutionary attempt to promote education reform on a national scale” (Superfine, 2005, p. 10). However, the logistics of enforcing the funding and assessment decisions proved to be daunting, and the Goals 2000 legislation lost much of its power within its first two years (Superfine, 2005). It also did not call upon states to have any specific requirements for certification of their teachers.

The No Child Left Behind Act of 2001

Starting with the 2001 reauthorization of ESEA, alternatively known as the No Child Left Behind Act of 2001 (NCLB), teacher quality standards were included in federal education reform legislation. In addition to linking federal funding directly to student test scores, NCLB, passed during President George W. Bush’s administration, speaks specifically about the need for quality in the teaching force in order to meet the education goals of the nation’s students. The language of the law states that it will “ensure high-quality teachers for all students, regardless of race, ethnicity or income, because a well-prepared teacher is vitally important to a child’s education . . . research demonstrates the clear correlation between student academic achievement and teacher quality” (U.S. Department of Education, 2008). The inclusion of a reported link between teacher quality and student achievement is novel in the NCLB law, and efforts to quantify this effect presently dominate the national education policy agenda.

This seemingly bold move in centralizing teacher quality standards did not ensure standardization of teacher credentialing or requirements between states. The law lays out guidelines, stating that schools must have, in order to receive federal funding, “highly qualified” teachers in all the core subjects: English, reading or language arts, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography (U.S. Department of Education, 2008). However, its definition of “highly qualified” is nebulous and open to some interpretation by the states. A highly qualified educator, the law states, is “fully certified,” holds at least a bachelor’s degree in the subject to be taught, and has “demonstrated competence in the subject matter and pedagogy” (U.S. Department of Education, 2008). But the law leaves open to interpretation what “fully” certified means, as well as how an educator demonstrates competence in the subject and in pedagogical methods. Many states took the former to mean that emergency certifications were no longer allowed, and most implemented standardized testing to measure teachers’ knowledge of their subject matter and teaching strategies in accordance with the latter requirements, but responses to the legislation were not uniform across the nation. Some education researchers have tentatively supported these measures, but not unlike the provisions of Goals 2000, the stipulations for teacher quality assurance in NCLB have proven somewhat difficult to enforce (Superfine, 2005).

Federal versus Standardized

Although NCLB allows states to continue to maintain their independence by using tests they create and setting their own standards for teaching and learning, the reality of the situation as it exists today calls into question the difference between an initiative being federally mandated

and its being de facto standardized. Indeed, both ideas fall under this article's definition of "centralization." There are "probably more commonalities than differences in state teacher education and certification systems," due largely to the influence of NCATE since the U.S. Department of Education recognized it as the sole source of professional accreditation for teacher education programs (Wang, Coleman, Coley, & Phelps, 2003, p. 16).

The educational testing establishment is another example. Although there are currently 30 different titles used for initial teaching certificates, and more than 50 titles used for second-stage teaching certificates, in use throughout the 50 states and Washington, DC (National Center for Alternative Certification, 2008), most states use the same Educational Testing Service (ETS) Praxis exams, once called the National Teacher Examinations, to determine eligibility for these certifications. Cibulka (1990) predicted almost 20 years ago that ETS "has been quick to exploit opportunities . . . to expand its own domain; teacher licensure . . . [is a] growth area through which it will consolidate further national influence" (p. 107), and it seems that this is indeed the case today. In addition, some states, like California, use both ETS tests and their own locally developed tests, and states like Massachusetts and New York use only tests that were developed specifically for use in their states. But close inspection reveals that these tests are developed by the same company, National Evaluation Systems, which provides "local" tests to 15 states (Pearson Education, 2008). This helps illuminate a complicated fact: States are permitted by the federal legislation to create their own systems of assessment of teacher quality, yet they largely use the same providers to create the assessments. In this way, teacher certification requirements since NCLB have become highly similar but not exactly centralized.

Given the somewhat diffuse nature of the NCLB legislation, and the fact that some of its provisions have also proven difficult to enforce, its effects on the quality of the teaching force are not easy to measure. However, one report released by ETS in 2007 claims that in the years since NCLB was enacted, several changes to the teaching pool have come about. The ETS report notes that SAT scores, Praxis II scores, and grade point averages of prospective teachers have all increased since 2001; that teacher education programs have become more accountable for reporting the scores of their candidates; that there have been notable efforts in many states to establish more content-focused teacher assessments; and that states have increased the minimum requirements, like GPA, for admission into their teacher education programs (Gitomer, 2007). The *New York Times* reported these same findings to the public in December 2007, stating that teaching candidates' SAT scores and grade point averages had increased in the years between 1995 and 2005 (Dillon, 2007). In addition, NCATE and the Teacher Education Accreditation Council now require candidates to provide evidence of subject-area knowledge and pedagogical skill at new levels (Gitomer, 2007). However, though public perception holds that the new requirements of NCLB have resulted in "better" teachers, educational researchers and policymakers still struggle to define this concept.

Defining Teacher Quality

Even when the increase in teacher supply seemed to give states an advantage in gaining control over certification, issues of teacher quality, and how to define it, came to dominate studies of teacher preparation policy. For the most part, this national conversation was based upon the assumption that the purpose of school is to produce high student test scores. A key problem

is that the relationship of this outcome to teacher inputs is unclear. Debates over the best way to judge teachers have centered on such available measures as scores on standardized tests of basic and advanced content knowledge and pedagogical skills, grades in college and graduate school, hours earned in teacher preparation courses and in student teaching, and, most recently, student outcomes (Darling-Hammond, 1990). One study showed that between 1960 and 1998, teacher salaries increased by 43%, outpacing nonteachers. Over that same period, IQ scores of teachers dropped (Hanushek, Kain, & Rivkin, 1999; Hanushek & Rivkin, 2007), which has led researchers and policymakers, as well as the public, to wonder about the quality of the available pool of teaching candidates and how best to improve it.

Mandatory Credentialing Critiques

Even if some aspects of incoming teachers and their preparation were to become commonly accepted as important, what remains to be proven is whether any of them (e.g., higher grades in college, higher scores on tests) have overall positive effects on education, particularly on student outcomes. Many researchers and policymakers have long had strong criticisms of mandatory credentialing, arguing that the practice keeps the best candidates out of teaching. Their complaints have not been quieted by the NCLB legislation and its effect on teacher preparation.

As early as 1954, economists Milton Friedman and Simon Kuznets complained that mandatory credentialing, that is, requiring the same test scores or course hours for every candidate regardless of his or her other unique characteristics and qualifications, creates unnecessary barriers to the teaching profession and discourages qualified candidates from applying (Friedman & Kuznets, 1954). Many echo this sentiment today, arguing that truly gifted teaching candidates are being lost because they have neither the time nor the inclination to invest in costly exams or additional degrees (Angrist & Guryan, 2008; Ballou, 1997). Critics argue that with mandatory minimums like these in place, districts tend not to pay any attention to the selectivity of the institution from which the candidate graduated or that candidate's grade point average. For example, when the minimum standard is number of course hours required, once this standard has been met, it tends to be all that is considered, causing districts to fail to screen on the basis of important qualities that affect student achievement outcomes, such as candidates' grades and SAT scores (Ballou, 1997). Districts thus miss out on hiring the best candidates.

Angrist and Guryan (2008) analyzed results from the Schools and Staffing Survey and concluded that mandated state certification exams are associated with higher wages for teachers, but not with any corresponding increase in teacher quality. They also noted that mandated exams seem to "deter high-quality applicants from teaching in public schools. Moreover, test requirements may disqualify some applicants that schools would otherwise want to hire," and exams seem to lessen the number of new Latino teachers in a state (Angrist & Guryan, 2008, p. 483). Likewise, the validity of exam scores and course hour requirements has been called into question by researchers like Lucas (1999)—exam scores claim to establish the depth of a candidate's knowledge, whereas the course requirements purport to ensure that incoming teachers get exposure to pedagogical methods, but how to ensure the quality in either situation, as well as which one has greater effects on student outcomes, is still unproven. There is no proven correlation, for example, between states with higher minimum Praxis score requirements and those with higher student test scores.

The Rise of Alternative Certification

Critics of mandatory credentialing have been around much longer than NCLB and its resultant tightening of state teacher licensing requirement processes. In 1986, William Bennett, then the secretary of education under President Ronald Reagan, urged legislators to drop “mindless paper credentials” because “we need to attract the best people to teaching, whether they are professional educators or not”; he added that educators need only have subject-matter knowledge, “good character,” and possibly an ability to communicate with young people (Grossman, 1989). This sentiment gave rise to a movement that seems at first glance to run contrary to the rise of centralized and standardized teacher certification: the alternative certification movement.

Alternative teacher certification programs vary in their design, but most have in common that they attempt to recruit and train people who did not major in education and have not earned teaching certification in their state. Some programs are administered by states, others by local school districts, and still others are overseen and organized by universities (Goodnough, 2000). In 1980, the Southern Regional Education Board recommended changes in teacher education to meet shortages in math and science fields. This led to the establishment of Virginia’s first alternative certification program in 1982, and 12 other Southern Regional Education Board states followed suit; their major impetus was to eliminate emergency certifications (Rubino, Soltys, Wright, & Young, 1994). New Jersey also developed a popular program in the mid-1980s, and alternative certification programs continued to grow and increase in popularity. These programs grew so popular that America 2000 gave federal aid to private nonprofits for recruiting and certifying the “most able” teachers (Rubino et al., 1994). Once this funding was set aside, organizations like Teach for America, founded in 1990, and the New Teacher Project, founded in 1997, started to grow in number and in size, providing interested prospective teaching candidates with an abbreviated preservice training and the opportunity to complete coursework, usually subsidized, while teaching in high-needs schools (Teach For America, 2008; The New Teacher Project, 2008). One reason these programs have enjoyed so much success may be because they respond to the public perception that traditional teacher certification is irrelevant and lacking purpose (Oliver & McKibbin, 1985).

In addition to the government funding set aside for the development of specific programs, a discretionary grant from the U.S. Department of Education in 2003 established the National Center for Alternative Certification, a nonprofit national clearinghouse for information about alternative routes to certification in the United States; it collects and analyzes data about alternative certification programs and provides technical assistance and outreach to states (National Center for Alternative Certification, 2008). The federal government continues to demonstrate its support by setting aside funding for these programs, which provide candidates with alternate routes to the classroom. Title II of the No Child Left Behind Act allocates funds for this purpose: “This year the Transition to Teaching program will allocate nearly \$42 million to states, school districts and nonprofit groups to help thousands of outstanding candidates enter teaching through alternate routes to traditional teacher preparation programs,” including Troops to Teachers (U.S. Department of Education, 2008).

Early analyses of alternative certification programs demonstrate that these alternate-route teachers do not have remarkably different academic achievement themselves, nor do they engender markedly different academic outcomes in their students (Goldhaber & Brewer, 2000; Ziechner &

Schulte, 2001). Findings such as these have contributed to the continued popularity of alternative certification programs.

As early as 1989, the American Association of Colleges for Teacher Education and Association of Teacher Educators released statements supporting alternative certification, provided the program is designed by all stakeholders and that the candidate has a bachelor's degree in the subject to be taught, is trained in pedagogy, and has a mentor (National Center for Alternative Certification, 2008). Since 1989, an estimated 200,000 teachers nationwide have been certified by the many different alternate route programs. However, like other teacher quality provisions in NCLB, alternative certification's impact on student achievement is highly contested by researchers (see, e.g., Darling-Hammond, Chung, & Frelow, 2002; Kane, Rockoff, & Staiger, 2006). Critics have complained that alternative certification "has been a product of competing but often unspoken political agendas and . . . characterized . . . by undefended assertions and counter-assertions grounded in mythology and half-truth" (Darling-Hammond, 1990). Nevertheless, the federal government continues to provide financial support for these programs and in 1992 even created its own alternative route to certification, Troops to Teachers (National Center for Alternative Certification, 2008).

In July 2003, then-secretary of education Rod Paige specifically cited the New York City Teaching Fellows as "one of the most promising models for alternative certification nationwide" and pledged continued government support of programs like it (New York City Teaching Fellows, 2008). Although control of teacher certification through these programs has the potential to be decentralized and context specific, programs run by The New Teacher Project or Teach For America, which exist in more than 45 states and regions (Teach For America, 2008; The New Teacher Project, 2008), raise some of the same issue facing teacher licensing exams. Although the state and federal governments do not mandate the curricula and requirements for these programs, most alternative certification programs are very similar, and many are even administered by the same national organizations—de facto centralized, if we take centralized to mean standardized and administered by a monolithic organization.

Schools of Education

Recent decades have also shown mixed roles for schools of education in the debates about teacher certification within the United States. Although the administrative progressives of the mid-1900s entrenched control of educational decision making in the hands of professionals, believing that organizations, not partisan political interests, are the best caretakers of public interests, the role of schools of education has since been complicated (Angus, 2001; Cibulka, 1990). Through the last decades of the 20th century and into the 21st, debates about how we should best prepare and certify teachers have largely been dominated by policymakers rather than education faculty or researchers.

State governments and schools of education once worked together, but this would be a difficult generalization to make in today's policy environment. Some schools of education have publicly opposed their states' initiatives to focus on standardized test scores. They emphasize instead the importance of coursework and student teaching on teacher quality, not surprising because they themselves are institutions whose livelihoods depend on their ability to sell these services to students. But in other states, education schools have remained silent. Still others have gotten

involved in the alternative certification movement, creating accelerated timetables and modifying course requirements to meet the staffing needs of their cities and states rather than insisting on their traditional courses; these schools often benefit from the subsidies these alternate-route teachers bring with them. It is difficult to speak of “education schools” as a monolithic entity in this day and age. Some organizations of schools of education, as well as highly regarded education policy researchers, have supported recent federal initiatives in teacher certification, but others have opposed them.

Although schools of education no longer speak with a unified voice on these matters, several professional school associations do have lobbying arms and release statements expressing their views on policy proposals. But divisions have also arisen within these organizations over the direction their work should take. In 2006, former president of Columbia University Teachers College Arthur Levine recommended abandoning one such organization, NCATE, altogether and enlisted the help of the nation’s “elite” schools of education in setting new standards for teacher preparation, including measuring student outcomes for teachers once they reach the classroom (Honawar, 2006). Other educational leaders argued that NCATE, which is currently responsible for accrediting slightly more than half of the nation’s 1,200 schools of education, is a work in progress that has already helped to raise the standards of the teaching profession. Some research demonstrates modest improvements in the scores of K-12 students whose teachers attended NCATE-accredited schools, but with only 17 states currently requiring that all their teacher education programs be accredited, the potential impact of NCATE, or any other accreditation body that might replace it, is probably limited (Honawar, 2006).

Teachers and Teachers’ Unions

Like schools of education, the role of teachers’ unions in the creation of more centralized processes and requirements for teacher credentialing—as well as the growth of alternative certification programs—is hard to characterize as a single unified entity. In the years immediately following World War II, classroom teachers, demoralized and overworked, sought a greater role in educational policy decisions. In 1946, The National Education Association (NEA) responded to this by creating the National Commission on Teacher Education and Professional Standards (TEPS). The purpose of TEPS was to “protect the public from incompetent teachers” and to protect its member teachers from having to compete with untrained people (Angus, 2001, p. 22). This organization was successful in convincing many state governments to place teacher education decisions in the hands of state boards of education. It also encouraged the creation of advisory boards, which can be viewed as a strong move toward centralization. By 1954, however, TEPS had been assimilated into NCATE, and owing to internal conflicts, the influence of classroom teachers waned significantly over the decades that followed (Angus, 2001).

Despite the successes of TEPS to increase and centralize standards of teacher certification, by the 1960s, classroom teachers started to lose interest in these matters and instead turned to a labor union model of representation. Angus (2001) stated, “The professional standards movement became a casualty of the rising teacher militancy and aggressiveness that transformed the NEA” as its rival American Federation of Teachers, which used the union model, grew in size and power (p. 40). Angus credited the NEA’s adoption of collective bargaining and aggressive teacher strikes with sharpening the divisions between various sectors of the education profession, including

liberal arts educators, education professors, and K-12 teachers. According to Angus, these tactics may have also promoted distrust and hostility between teachers and administrators. He believes that this killed the professional model, and with it the professional standards movement (Angus, 2001).

Because most educational policy researchers consider unions to be at best benignly useless and at worst obstructive and “tending to promote mediocrity” (Bascia, 2003, p. 3), it is difficult to track the involvement of teachers’ unions in recent educational reforms aimed at teacher quality. One critique of National Board Certification includes the involvement of teachers’ unions in the process of certification as a major negative quality (Ballou, 2003). Popular media’s choice of reporting also contributes to the perceptions of teachers’ unions as singularly focused on raising teacher salaries. The United Federation of Teachers in New York City, one very powerful and vocal union, and by far the nation’s largest local union, seems, from the coverage it receives in local press, neither to support emphatically nor oppose strongly most of NCLB’s new standards or its funding of alternative routes to certification like the New York City Teaching Fellows. The United Federation of Teachers merely points out that programs like this one do nothing for the major concern of the union, higher teacher salaries (Delisio, 2001). However, in a study of six teachers’ unions between 1998 and 2001, one report demonstrated that these unions, at both state and local levels, did contribute to the establishment and use of stricter teaching standards in ways that helped to improve teacher quality, for example, helping write state legislature linking teacher salaries to National Board Certification (Bascia, 2003).

HOW DID WE GET HERE?

In his 1990 piece on government power and its relation to educational reform in the United States, Cibulka attempted to elucidate the seemingly simultaneous movement toward greater and less government regulation. He explained that the Sputnik challenge eroded much of the educational professionals’ authority. Simultaneously, the federal government began to reform education in response to public concerns (Cibulka, 1990). These reforms continued to come from government because “it was no longer credible for the educational establishment to claim that its ideas were clearly aligned with the public interest or that its views represented all the members of the profession” (Angus, 2001, p. 16). Bales (2006), in her report on teacher education reforms since 1980, pointed out that the “key . . . is the assumption that teacher education professionals are not adequately preparing candidates who can address the achievement needs of students in their classrooms” (p. 403). Hitz (2008) stated simply, “Teacher preparation and licensing are constantly under attack from both national and state policy makers” (p. 476). In addition, the federalist nature of the United States tends to make states very resistant to giving control of these processes to the federal government. Power struggles continue to push teacher certification toward, while pulling it away from, centralized control.

Even beyond Cold War national security concerns about education, the educational system has long been criticized for failing to produce students able to keep the United States competitive in an increasingly globalized economy. This trend is not unique to the United States. As Guthrie (1990) pointed out, “Increasingly, nations expect lower and higher education systems to contribute forcefully to economic growth and are enacting reform policies to accomplish this objective” (p. 109). The addition of this demand means that educational systems are expected to produce

students whose skills meet the needs of domestic employers, whose abilities are in line with those of students all around the world, whose accomplishments keep their nations physically secure, and whose knowledge satisfies the public perception of what citizens should know. These demands come from different sectors and complicate the relationship between systems of education and their governance.

CONCLUSIONS

Teacher certification trends in the United States since World War II paint a complicated picture of powerful interests at different levels making demands and trying to institute disparate reforms. These patterns have varied over time, with some eras seeing more teacher applicants than available positions, and still others experiencing teacher shortages. Oversupply has at times allowed states to take hold of the reins and control the teacher certification process, whereas undersupply has at times necessitated a lessening of requirements, thereby giving districts more control over filling vacancies. The federal government got involved when education professionals' competence came under attack in the years following the launch of Sputnik. The public's concerns about how our schools prepare students for domestic citizenship as well as global economic competition have grown since then (Cibulka, 1990), and businesses have advocated for schools to produce students they will want to employ. The tensions over the size and scope of state and federal control that characterize many areas of American policy are crucial in education (Angus, 2001).

The current policy environment in the United States involves several seemingly contradictory components and adversarial actors, including federal legislation that sets standards for teacher qualifications but allows states to make the final decisions about how to define those standards; states choosing to use the same testing companies to design their independent teacher assessments; and the rise of alternative routes to certification, which seem in some ways to circumvent the very requirements of the federal legislation that support them. On top of all of these concerns, President Obama's potential changes to the existing NCLB law remain to be seen.

As Hitz (2008) articulated,

Policy makers realize that teacher qualifications are important, but they do not trust the teaching profession to hold itself to high standards for preparation. Policy makers and the community at large are crying out for direction, and, as those in the profession struggle to reach consensus and unity, other entities fill the leadership void. (p. 746)

As the United States attempts to reform its education system in response to the ever-increasing demands of participation in the global economy, control of teacher preparation and certification will continue to have to respond to multiple stakeholders.

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Why “What Works” Still Doesn’t Work: How to Improve Research Syntheses at the What Works Clearinghouse

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The What Works Clearinghouse (WWC) aims to synthesize and disseminate the results of high-quality education research on areas of significant public interest. The WWC has come to serve as a concrete example of the growing willingness of the federal government to shape both the topic and methods chosen by researchers. However, the scope of research included in the WWC research synthesis is rather narrow, omitting a large number of studies on methodological grounds. This article reviews current WWC standards and argues that the scope of research used in WWC reports should be broadened in two ways. First, the research should include a wider range of scientific studies. Second, it should include conceptual and theoretical research, which often originates from humanities and arts-based disciplines.

The passage of the Education Science Reform Act (2002, PL 107–279) marked a defining moment in the current era of federal involvement in education research. Among its many legacies is the What Works Clearinghouse (WWC)—an initiative of the U.S. Department of Education’s Institute of Education Sciences—established by the law to disseminate high-quality education research on areas of significant public interest. The WWC has come to serve as a concrete example of a renewed willingness on behalf of the federal government to align both the topic and methods used by researchers with its own substantive policy priorities.

The methodological standards used by the WWC to determine whether a study should be included have prompted considerable scrutiny. Even with the expansion of eligible research designs, the vast majority of studies are considered too weak for inclusion. This highlights a difficult choice. On one hand, if the standards are too broad, the government might include studies of poor quality. On the other hand, if the standards are too narrow, the reports may exclude evidence of use to those who might read it.

Some have argued that the WWC cannot possibly succeed in providing evidence of what works (Biesta, 2007; Smeyers & Depaepe, 2006). This article takes the position that success is possible, but only if the scope of research featured in the WWC reports is broadened in two ways. First, it should include a wider range of scientific studies. Second, it should include conceptual and theoretical research, much of which originates from humanities and arts-based disciplines. In the following pages, this article presents a brief history of the rise of the WWC

and the arguments leveled against its existence. It concludes with an outline of the ways in which broadening the scope of the WWC's reports will allow the organization to successfully play the role of a centralized, national agency dedicated to informing policymakers about the current state of knowledge concerning the effectiveness of educational programs.

THE RISE OF WHAT WORKS

As with many aspects of the current education landscape, the beginnings of the WWC can be traced to the publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983). This report is most widely remembered as an emotionally stirring indictment of public education in the United States. However, although the report generally found that the education system was failing miserably, it presented the problems of education as moral and political rather than scientific or technical. Education research is mentioned neither as a contributing cause of the illnesses plaguing American education nor as a potential cure. Rather, it was argued that the country knew exactly what was wrong and how to fix it, but lacked the will to take the necessary corrective action.

This attitude was later encouraged by William Bennett, Secretary of Education from 1985 to 1988. One staffer working for Bennett later said that he believed the Department of Education should simply try "to get people to do what they know they ought to be doing" (Kaestle, 1992, p. 28). Bennett was convinced that education research was unnecessary in the government's attempts to address the core problems facing schools. Another staffer later stated that Bennett believed that "the solution lies in conviction, in character, not in understanding the cause of the phenomenon" (Kaestle, 1992, p. 28).

In 1986 Bennett and the Department of Education (DOE) released the booklet *What Works: Research About Teaching and Learning*. This booklet encapsulated Bennett's belief, as well as that of his Assistant Secretary of Education Chester "Checker" Finn, that the main problems of education had been resolved and that the only challenge now was to raise awareness and acceptance of proven educational interventions. *What Works* was supported by an unprecedented dissemination campaign. The Department of Education gave out more than 500,000 free copies of the report. The report issued some 41 policy recommendations, from the banal recommendation that children should be "seen *and* heard" to the more controversial recommendation that students begin phonics at an early age (DOE, 1986, p. 19). The booklet argued that the way to improve education was not to increase expenditures to education or education research but to increase educators' commitment to doing what they already knew they should be doing.

What Works failed to gain credibility and influence. David Berliner and Bruce Biddle (1995) characterized it as propaganda disguised as a research review. Checker Finn freely admitted that the report had minimal real impact. As the report faded from memory, so did the DOE's emphasis on causal research. However, the movement underwent a renaissance by the very people who had been most critical of its early origins—namely, education researchers. During the 1990s, several national organizations began to rally around the idea of creating a clearinghouse by which educational practices and products could be systematically evaluated and then disseminated to the public (Walters, 2009). Unlike the DOE report, the research syntheses issued by such a clearinghouse would embrace rigorous and transparent standards.

The WWC came into existence as a result of the passage of the Education Science Reform Act of 2002. It was a substantive and symbolic example of a new emphasis on experimental research on causal questions. The primary products generated by the WWC have been research syntheses that attempt to identify the very best studies available that evaluate educational interventions and match major policy priorities, such as drop-out intervention, language education, and early childhood education. These reports attempt to identify whether the programs “work”—that is, whether the evidence presented in the studies indicates that the programs successfully meet a range of relevant outcomes.

The WWC is the first federal agency to exercise such selective criteria in its evaluations of the quality of education research. This raises a number of interesting questions about (a) whether the federal government should create an agency to narrowly focus on questions about causation and (b) whether the research embraced by such an agency should be restricted to certain research designs. In the following sections, I address both questions.

SHOULD THE FEDERAL GOVERNMENT FOCUS ON “WHAT WORKS”?

The first criticism is aimed at the general emphasis on “what works” questions. This criticism comes in a number of forms, two of which I examine in this article. First, education is a complex field in which simple causal connections cannot be made between interventions and outcomes. Second, even if causal investigation is possible, there are more important areas of emphasis that are now neglected due to an emphasis on what works.

Can Education Research Establish Causal Connections?

A great deal of debate over WWC standards focuses on which research methods and designs can provide evidence of causal relationships. Thus, it may be useful to start by evaluating an argument that there are *no* empirical methods capable of establishing causal connections.

Such an argument can be found in Emery Hyslop-Margison and M. Ayaz Naseem’s (2007) *Scientism and Education: Empirical Research as Neo-Liberal Ideology*. Their basic argument rests on the claim that human actions are not causally determined, thus causal research into human affairs (such as education) is impossible. The authors base their argument on the claim that our “lived experience” shows that it is not the case that “human actions are causally determined by antecedent forces that can be identified and manipulated” (p. 4).

However, the authors’ appeal to “lived experiences” seems to suffer from a biased sampling framework. If we look at the full range of lived experiences, it seems clear that although we might experience freedom (or at least the feeling of freedom), it is unlikely that anyone has ever had a “lived experience” not caused by antecedent forces. Decades of work in fields as diverse as sociology, cognitive science, and phenomenology continue to remind us of the importance of institutions, brains, and bodies. In fact, it is the very acknowledgment of the influence of such forces that allows us to redirect them in ways that maximize our capacity for free action. Antecedent forces, to borrow the authors’ term, both enable and constrain our choices. It is in understanding how these forces work that social progress becomes more secure. Indeed, the authors’ own insistence on social and political reform seems to assume such a view. If

it were not for the assumption that conditions in the real world—such as the distribution of income—significantly influence the range of human possibility, there would be no reason to support the various political reforms they champion.

A more persuasive argument implied by Hyslop-Margison and Naseem’s skepticism is that the processes of causation in human affairs are so complex that no scientific method could possibly untangle them. However, education researchers have long embraced this reality, happily recalling the now famous dictum that education research is “the hardest science of all” (Berliner, 2002).

This complexity is not a reason for passivity but for a renewed commitment to inquiry (Dewey, 1984, 1988). Indeed, if the world were simple, scientific investigation into the connections between antecedents and consequents might be unnecessary. Complexity gives science its *raison d’être*. It seems rather odd to state a priori that education is so complex that nothing can help inform the decision to keep children in classrooms of 15, 20, or 50 students; or to see to it that teachers are educated through middle, secondary, or postsecondary school; or to have children spend 10, 20, or 200 min per day in physical activity.

Is Education Research on What Works Necessary?

Carl Kaestle (1993) famously chronicles the “awful reputation” of education research. The skepticism of some politicians was alluded to earlier, when William Bennett and Checker Finn seemed convinced that further research into education problems was a waste of resources. This skepticism is no doubt part of the explanation as to why education research is now as closely monitored and evaluated as it is. However, the academic community has not exactly united to rush to the defense of empirical education research. In fact, a significant number of people working within education schools argue that most education research is irrelevant, immoral, or both. In this section, I examine what might be usefully characterized as *skepticism concerning the relevance of empirical knowledge to educational problems*.

Skepticism about education research is often the result of a belief that the true problems of education are matters of morals or politics and thus require changing the hearts of individuals or changing social and political institutions. This assumes that the answers have already been found and that all is needed is the conviction to act accordingly. Thus, the left-leaning Hyslop-Margison and Naseem and the rightward-leaning members of Ronald Reagan’s 1980s DOE both believed that education research serves primarily as a way to smuggle reprehensible values into education while shielding these values from criticism. Just as Hyslop-Margison and Naseem assumed that research is used to cloak conservative values, Edward Curran, who served as director of the National Institute of Education while advocating for its abolition, reportedly suspected that social science was being used within the agency to justify a pro-government liberal agenda (Vinovskis, 2001). Both have argued that education research distracts us from, as Hyslop-Margison and Naseem stated, “proper moral decision making” (pp. 5–6), or as William Bennett’s views were described, getting “people to do what they know they ought to be doing” (Kaestle, 1992, p. 28). Hyslop-Margison and Naseem’s claim that “we already possess the required knowledge and resources” to fix our problems but lack the “political and moral will to transform that knowledge into political, social, and ultimately, educational action” (pp. 5–6) is remarkably similar to William Bennett’s view that the “solution lies in conviction, in character, not in understanding the cause of the phenomenon” (Kaestle, 1992, p. 28).

It is difficult to imagine how either position could be consistent with a commitment to democratic governance. Presumably, those who believe that we know how to improve education should be forthcoming and specific in explaining how to do so. They should propose some intervention. It would then be fair to ask for evidence that this intervention—whether it be the nationalization of the means of production or the abolition of teacher tenure—will lead to the promised outcomes. It seems, to state it mildly, *morally hazardous*, to take actions that affect the public without providing publicly accessible evidence about the likely outcomes.

We can elaborate a bit on the justification for federal funding for research on what works in education. First, the government has a role to play in the provision of mechanisms for public deliberation about public programs. This is a basic issue of transparency. The government must sponsor research that can help people deliberate over whether or not a public program is accomplishing the goals for which it was designed. That is, there must be continuous evaluation of whether it “works.” Evaluations of program effectiveness are a standard part of most government operations. It is unclear why the government should make an exception for education programs, or assume that funding for such evaluations will appear from the private or nonprofit sectors. Second, the government has a role to play in supporting research that addresses matters of general welfare. There is a public benefit to be gained by advancing knowledge of the effectiveness of new approaches in education, just as there are benefits to be gained from knowledge of advances in medicine, agriculture, transportation, energy, and the humanities and arts. This benefit is shared across states, thus making education research a national public good.

This does not rule out the possibility that the a specific program aimed at supporting what works research might be ill-conceived or have negative consequences for other important areas of education research. Thus, it is just as important to decide *how* the government should intervene as it is to decide *whether* it should. It is on this vital question of *how* that the next section turns—specifically, whether the current methodological standards employed in WWC research synthesis are appropriate for finding out what works in education.

WHAT SHOULD BE INCLUDED IN WWC REPORTS?

As just suggested, the problem is not that the WWC has focused narrowly on what works but has instead focused narrowly on the kinds of evidence relevant to understanding what works—specifically, it has excluded many relevant forms of social scientific empirical inquiry as well as all forms of conceptual and theoretical inquiry. The result is that the nature of many of these interventions is poorly understood—their effectiveness or lack thereof remains mysterious. Imagine a WWC research synthesis of the evidence on class-size reduction. As a randomized control trial, the Tennessee STAR experiment would surely meet the standards for inclusion. However, this study did precious little to tell us whether class-size reductions “work.” This is in part because we do not have good evidence about “what” the salient parts of the intervention were—was the mechanism for increased test scores in some segments of the treatment group due to teachers being able to allocate more time to each student, or to adopt more inventive and time-consuming pedagogical strategies, or spend less time on administrative work like grading, or prevent disciplinary problems, or some combination of all of the above? A standard qualitative study of small classrooms might be a more efficient way of answering such questions, but such

a study would be excluded from a standard WWC research synthesis. Without knowing what is happening, it is hard to know what exactly is working.

In addition, WWC research syntheses need to include more comprehensive research on what it means for a program to “work.” It is rare that any action has but one effect. One of the dangers of conceiving the main purpose of research as the search for “what works” is that it suggests a focus on a narrow range of effects. This can lead the public to ignore questions over whether the effect is desirable, and to stop searching for a better understanding of peripheral effects. A program may effectively raise student scores on a given test, but only by absorbing massive resources, or sacrificing public involvement, or giving up on the more liberal goals of education. Or it may bring about a certain effect that not all people desire, such as certain political dispositions or attitudes.

One final potential negative consequence is that the push to evaluate whether something works may lead researchers to ignore the important question of *why* it works. Phillips (2008) illustrated this with an example of small high schools, a movement once popular with donors and now fading from the policy agenda:

It might be a reliable finding that (on average) students learn more in high schools of medium size than they do in very small or very large schools, but this effect is mere magic if the mechanism producing the impact on learning is not known. It would be sad if the contemporary advocates of the “gold standard” turned out, in essence, to be supporters of the dark arts because of their refusal to countenance the search for underlying causal mechanisms as an important (even an indispensable) part of the scientific enterprise! (pp. 183–184)

The further one pushes the question of why, the closer one can get to isolating the part of the intervention that is essential to the outcome of attention. When one isolates the mechanism, one can begin to isolate the desirable parts of the intervention from the more noxious elements (Deaton, 2010).

Research Disciplines

The common wisdom both among members of the academic community and within government agencies is that scientific research—specifically, experimental research and a small number of other designs—is best suited to answering what works questions. The notion that humanities and arts-based research may have a role to play was thoroughly dismissed by the first director of the Institute of Education Sciences (IES), Grover “Russ” Whitehurst. In his address to the American Education Research Association, titled “The Institute of Education Sciences: New Wine, New Bottles” (2003), he stated,

People on the front line of education do not want research minutia, or post-modern musings, or philosophy, or theory, or advocacy, or opinions from education researchers. . . . The people on the front lines want to turn to education researchers for a dispassionate reading of methodologically rigorous research that is relevant to the problems they have to solve. They are surrounded by philosophy, and theory, and points of view. They want us, the research community, to provide them a way to cut through the opinion and advocacy with evidence.

Humanities and arts-based research is portrayed not only as unhelpful but as obfuscatory and partisan. Scientific research can bring an end to the confusion caused by philosophers, theoreticians, and postmodernists.

However, excluding the humanities and arts from investigations into what works might be the worst thing one could possibly do to the sciences. To take just one example, political philosophers have spent entire careers dedicated to clarifying the rights and responsibilities attached to democratic citizenship. Their writings display a level of analytic precision and sophistication seldom found in empirical research journals. This work could do much to improve the WWC research reports on character education. They can help social scientists improve their concepts and measures so that they better align with sophisticated understandings of character and citizenship, rather than being pale and poor approximations of the complex realities they aim to describe. These concepts and measures embody aims and purposes. Philosophers can help make these explicit.

Philosophers are not the only humanists of use in finding what works. One of the most frustrating aspects of education reform is its ahistorism. Historians can help educational researchers learn from past mistakes, preventing them from being dragged into evaluations of old ideas under new packaging (Lagemann, 2005). Rather than being obfuscatory, philosophical and historical research is perhaps the last, best chance to conduct scientific research, which is as conceptually and theoretically rigorous as it is technically complex.¹

It may not be within the mission of the IES to fund and disseminate research originating from the humanities. However, the appropriate response then is to either fold IES into a broader research agency that can support the complete range of research necessary to answer what works questions or to create a separate entity devoted to humanities and arts-based research. The DOE could operate the educational equivalents of the National Science Foundation and the National Endowment for the Humanities.

Research Designs

In the previous section, I argued that what works questions are best answered by synthesizing both scientific and humanities research. In this section, I focus on the kinds of scientific research that should be included, with a special emphasis of research designs.

Throughout the last decade, IES has clearly indicated that, for causal questions, randomized control trials are the “gold standard” by which other designs and methods are judged. This was established early by IES Director Whitehurst (2003), who emphatically stated, “Randomized trials are the only sure method for determining the effectiveness of education programs and practices.” Under Whitehurst’s leadership, early WWC research synthesis included only randomized control trials and a limited range of quasi-experimental designs. With such a limited range of studies at their disposal, the WWC was rather slow to compile evidence about the effectiveness of educational programs, leading to the rather unfortunate impression that there was no evidence that anything in education “worked.”

¹This article has assumed that there is a useful distinction to be made between “scientific education research” and “humanities and arts-based research,” both admittedly catch-all terms. Such a distinction can be useful, so long as one is cautious in the inferences one draws from it. For instance, it does not follow that the two have radically different ontological or epistemological commitments, or that the former consists of objective inquiry into facts and the latter subjective inquiry into values (Anderson, 1998; Lykins, 2009; Putnam, 2002). Nor does it follow that one is inherently better for examining “what works,” whereas the other is better for examining what it should work toward.

The methodological constrictions began to relax toward the end of Whitehurst’s tenure and the beginning of the tenure of his successor, John Easton. In recent years, WWC has gradually expanded the range of evidence to include regression discontinuity designs and single-case designs (Kratochwill et al., 2010; Schochet et al., 2010; What Works Clearinghouse, 2008). However, a strong preference for randomized control trials remains evident in the evaluations WWC assigns to each research study. The WWC grades research studies on a 3-point scale: (a) meets evidence standards, (b) meets evidence standards with reservation, and (c) does not meet evidence standards. Randomized control trials are the only design that can earn the WWCs a rating of “meets evidence standards.” The highest rating possible for any other design is “meets evidence standards with reservations” (What Works Clearinghouse, 2008).

Although the inclusion of quasi-experimental, regression discontinuity, and single-case designs is welcome, a great amount of important scientific evidence is still excluded from WWC research syntheses. It is hard to imagine other scientific fields progressing with such a narrow range of methodological tools. An overreliance on randomized control trials has been resisted in other fields, including development aid (Deaton, 2010). Astrophysics, geology, evolutionary biology, anatomy and physiology, and epidemiology have all made significant advances through techniques other than experiments. The results furnished by these techniques seem to be at least as sure as the inferences drawn from the results of experiments in education research (for a good discussion, see Feuer, 2006, p. 61).

Strictly speaking, the question of what works is not a question of what *worked* but of what *will* work, for whom, under what contexts, and at what cost. The WWC makes its job much more difficult by forbidding itself access to the scientific tools that help investigate these issues, such as ethnography, participant observation, and so forth. These research approaches can help give clues as to whether the success of an intervention depends on certain cultural or institutional factors, or whether in some cases it can be done at less expense, or whether unanticipated positive or negative effects lurk beyond the time frame and scope of the study.

Educational interventions are never identical. It is difficult to examine how evidence about the effectiveness of one intervention relates to the effectiveness of a future intervention. Take, for example, the POINT Experiment, a 3-year randomized control trial on the effectiveness of teacher performance incentives. The experiment, which included both quantitative and qualitative evidence, found that the incentives had no effect on student performance (National Center on Performance Incentives, 2010). However, this tells us little about the effect of teacher performance incentives as such. All it tells us is that this *particular* incentive—let us call it i' —had no effect on this particular measure. The failure of i' could be due to it being too small or too large, either as a total amount or as a percentage of base pay. The failure could be due to the fact that it was linked to individual teachers rather than the entire school. The failure could simply be due to one of many possible measurement problems, such as choosing the wrong outcome or measuring the outcome too early or too late. Alternately, the failure might be due to the nature of the targets—they might have been either too easy or too difficult to achieve, or might have overincentivized cooperation over individual effort or individual effort over cooperation.

In itself, the study of i' does not give us sure evidence of the causal efficacy of performance incentives. Many popular education policy reforms, such as school choice, performance pay, and test-based accountability, exist in multiple forms. No amount of methodological sophistication can guarantee reliable inferences from the efficacy of one permutation of the reform to another. The overemphasis on a narrow range of research designs not only excludes good evidence but

also can mislead policymakers and the public into thinking that they offer “definitive answers to complex questions” (Feurer, 2006, pp. 63–64). Valid generalizations depend on reason, logic, and a wider range of empirical data. For instance, a relatively inexpensive teacher survey may reveal more about the likely consequences of incentive pay than any costly experiment.

The same lesson can be gleaned from the much-studied Tennessee STAR experiment in class-size reduction. The results of the randomized control trial suggested that class-size reduction caused modest gains in the test scores of children in early grades. Boruch, de Moya, and Snyder (2002) cited this study as evidence that “a single experiment can help to clarify the effect of a particular intervention against a backdrop of many nonrandomized trials” (p. 74). In fact, the experiment taught, at most, only that class-size reductions were responsible for increased test scores *in this particular context under these particular conditions*. It did not lend warrant to the claim that class-size reductions are an effective way for raising achievement as such. This became clear when California implemented a state-wide policy of class-size reduction. The California program not only failed to increase student achievement but may have also been responsible for a substantial increase in the number of poorly qualified teachers in high-poverty schools, thus actually harming student performance by lowering teacher quality.

MAKING THE WWC “WORK”

In both examples, we see that the real questions about what works are answered not by examining *whether* an intervention succeeds or fails but *why* it succeeds or fails (Deaton, 2010; Phillips, 2006). For the WWC to fulfill its role as the nation’s centralized distribution center for credible reports on what works, it will need to embrace a wider range of scientific designs, as well as theoretical, conceptual, and historical research originating from the humanities. If it is successful in creating such reports, policymakers would for the first time have access to documents that truly indicate the extent of our knowledge about how to meet some of our greatest educational challenges.

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Centralization and Decentralization in American Education Policy

Jennifer DeBoer

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This issue examines the trend toward centralization in American education policy over the last century through a variety of lenses. The overall picture that emerges is one of a continuous tug-of-war, with national and local policymakers stumbling together toward incrementally more standardized and centralized policies. There is a center of power that increasingly wants to dictate even the minutiae of research methods but cannot immediately manage the oversight and regulation of a large, complex, piecemeal system of education. The diversity of needs, philosophies, and opportunities overwhelms this system. Local policymakers are approaching the use of a common language from different corners of the country, but they have historically been so separated that they continue to grapple with this newfound integration.

INSIGHTS FROM INDIVIDUAL ARTICLES IN THIS ISSUE

Even for a large, diverse country, and even after developments over the last century, the United States is a decidedly decentralized system. This is especially true for education policy. Although the education sector is moving more toward a centralization of its decision making, educational policy is nowhere near the level of centralization across every dimension of policy—curriculum, teacher workforce, identity—that exists in some other countries. If centralization in the United States has occurred, it has done so at the state level. The identity of individual states in the United States may be as crucial to local identity as unified national identity in some other national systems. The increased role of the intermediate federal division (state, province, region) is comparable to what can be observed internationally, whether that means a country is centralizing or decentralizing. The American trend is toward a more solidified federalism, a more accepted back-and-forth between states and national leaders. Although this both mirrors and contradicts international trends—some nations are moving toward state-centered policies, whereas others are moving away—this state-level acceptance of centralization is a dramatic change from the early practices of the American government.

The framers of the American constitution may have viewed education as a right so sacred that it should be a power reserved for the states. There have been major shifts since then in the interpretation of the founding documents of the United States. By allowing for the constitutionality

of “conditional grants,” the federal government created an avenue to enter an area of policy that was previously assumed to be the reserved domain of the states. The courts, therefore, do not shy away from addressing questions of education, but they remain reluctant to address the idea of a “right to education.”

Nevertheless, the courts appear to be a productive and common means by which local education issues enter the national arena. Even though multiple branches of government may be involved, as is the case for bilingual education policy, the judicial branch often takes the lead. Perhaps the established channels of centralization—the clear road for unresolved conflicts to move toward more centralized decision makers—places the courts and a “rights-based” centralization of policies at the forefront of changes in educational governance. Federal protections for special populations turn problems in the schools into civil rights questions. Ensuring educational opportunity, though not guaranteeing education as a civil right, compelled the federal government to get involved in the oversight of the provision of schooling.

And it is around educational opportunity that the language of many local voices has coalesced into a national dialogue. Terminology of educational policies from across the country marks a “march toward increased centralization” (Meyers, 2012/*this issue*, pp. 469). States need to be able to access the nationally accepted terms because of “social, political, and economic pressures” (Meyers, 2012/*this issue*, pp. 470). No Child Left Behind (NCLB) represents the culmination of a half-century of increasingly similar needs in states as different as Maine and Hawaii, arising from similar demographic trends and increasing intranational mobility. These needs mark a shift toward comparing education systems internationally rather than by state.

Parallel trends in the teacher labor force make national certification a pressing but difficult question. The history of teacher certification is one of inconsistent movement toward more centralization, as the complicated relationship between teachers, unions, policymakers, and parents plays out at the local, state, and federal levels. The back-and-forth power struggle moves alongside the supply of teachers in the labor force; as the supply of teachers decreases, teacher certification becomes a localized issue, catering to the heightened needs of each school district. When supply is greater, federal control increases. In both cases, recent developments have increasingly left out education professionals from the discussion. The struggle to hold the authority over educational decisions not only puts different levels of governance at odds, it also pits stakeholders from numerous disparate interest groups against each other. Educational policy thus becomes an ideological battleground.

Education research itself has seen an ideological and philosophical battle play out on the federal stage. The research-related acts that followed on the reauthorization (NCLB) of the Elementary and Secondary Education Act dictated not only that education research be used but also what type of research would be valued. The carrot of conditional funding provides both the need for educational research and the federal government’s justification for intervening in an area previously restricted to states, districts, and academic institutions. However, federal policymakers may have practically overcentralized an important component of policymaking. By dictating not only that research be done but also *how* it is done, the federal government limits itself from seeing the ground-level perspective that reveals *why* interventions succeed or fail. Greater balance and collaboration between invested and informed stakeholders—in education research policy, in teacher certification, in bilingual education, and in the other important facets of American schooling—could make a more centralized American system more coherent, equitable, and productive.

ANALYSIS

This edition of the *Peabody Journal of Education* notes that the rate of centralization is not constant (Mavrogordato, 2012/this issue), and although sometimes cyclical (Tobin, 2012/this issue), the overall trend continues to shift toward increased centralization. Centralized powers expand, and states react noticeably when federal regulations become significantly more dominant or when federal policy lacks a unified voice. When plans are not cohesive at one level, the other may intervene. When this happens, policies at each level may contradict one another. This contentious tussle toward centralization reflects the dynamic, noisy, yet continuous trend described in Tyack and Cuban's notion of "tinkering towards utopia" (Tyack & Cuban, 1997).

Both sides of the aisle cling to education as a heartstring issue. Myriad stakeholders and powerful interest groups from diverse backgrounds use public schools as political tools, often vying to classify their solution as education's silver bullet (Meyers, 2012/this issue; Tobin, 2012/this issue). Education is an emotional and penetrating battleground for power brokers in the political system.

American politics is a stage, and the subject of education is one that receives a great deal of attention and passion. Public interest is nearly constant, and usually not because of the high regard the general American populace has for its primary and secondary education system. A concerned public usually thinks that the education system is failing—failing individuals in certain groups, failing to create an educated workforce, and failing compared to other countries. This rhetoric is clearly an important driver of policy and practice, and a line of study in and of itself (Lykins, 2012/this issue; Meyers, 2012/this issue).

Despite America's precedent for local control over the schoolhouse, national policymakers have found two major pathways into education governance—the judicial system and conditional funding. Despite the fact that the federal constitution makes no explicit mention of education, the federal judicial system has been home to some of the most important education debates in the last century, and its decisions have often shaped local schooling from the national level (Haubenreich, 2012/this issue; Mavrogordato, 2012/this issue). By offering funding contingent upon adhering to national standards, the federal government can convince states that it is in their best interest to centralize.

The national government sees its best interest in centralization. International competition is a major driver for policies at the national level, which may be diffused to local levels as well (DeBoer, 2012/this issue), and rhetoric citing the efficiency of foreign education machines is productive fodder for political rallying cries. The United States, though historically one of the most decentralized education systems, finds itself slowly moving away from one end of the decentralization spectrum. Although this implies that the United States is becoming more similar to most other national education systems, it also indicates that the United States is going against the prevailing trend in contemporary education governance to decentralize institutions.

POLICY IMPLICATIONS AND THE NEAR FUTURE

Is American education policy more centralized than it was a century ago? Broadly, yes. In numerous dimensions, more interventions are being influenced by decisions made at the national level. Conclusions from a previous issue of the *Peabody Journal of Education* also generally find

that, although there might be opposing efforts both to centralize and disperse power to various educational authorities, federalization and the solidity of the local–state–federal institution has certainly increased (Mitchell, Shipp, & Crowson, 2011). Although this trend is not constant, even very local movements are more coordinated and more attuned to national policymaking. The center of power for education in the United States is shifting toward the center. The Department of Education, a cabinet-level position, was unheard of 50 years ago.

Educational governance appears to be on track to continue to become more centralized in the United States. But perhaps policies such as national testing are more likely to be instituted than a national curriculum. The history of the U.S. education system is fiercely diverse and decentralized. Given the atmosphere of outcomes-based assessments, a national exam would allow for individualized curricula and local choice of method as long as students can equitably achieve proficiency on skills that are nationally valued. Diverse stakeholders also have long-standing historical quarrels; as the United States enters the second decade of the 21st century, the increased federalization and slight growth in centralized power for education governance may be slowed even further.

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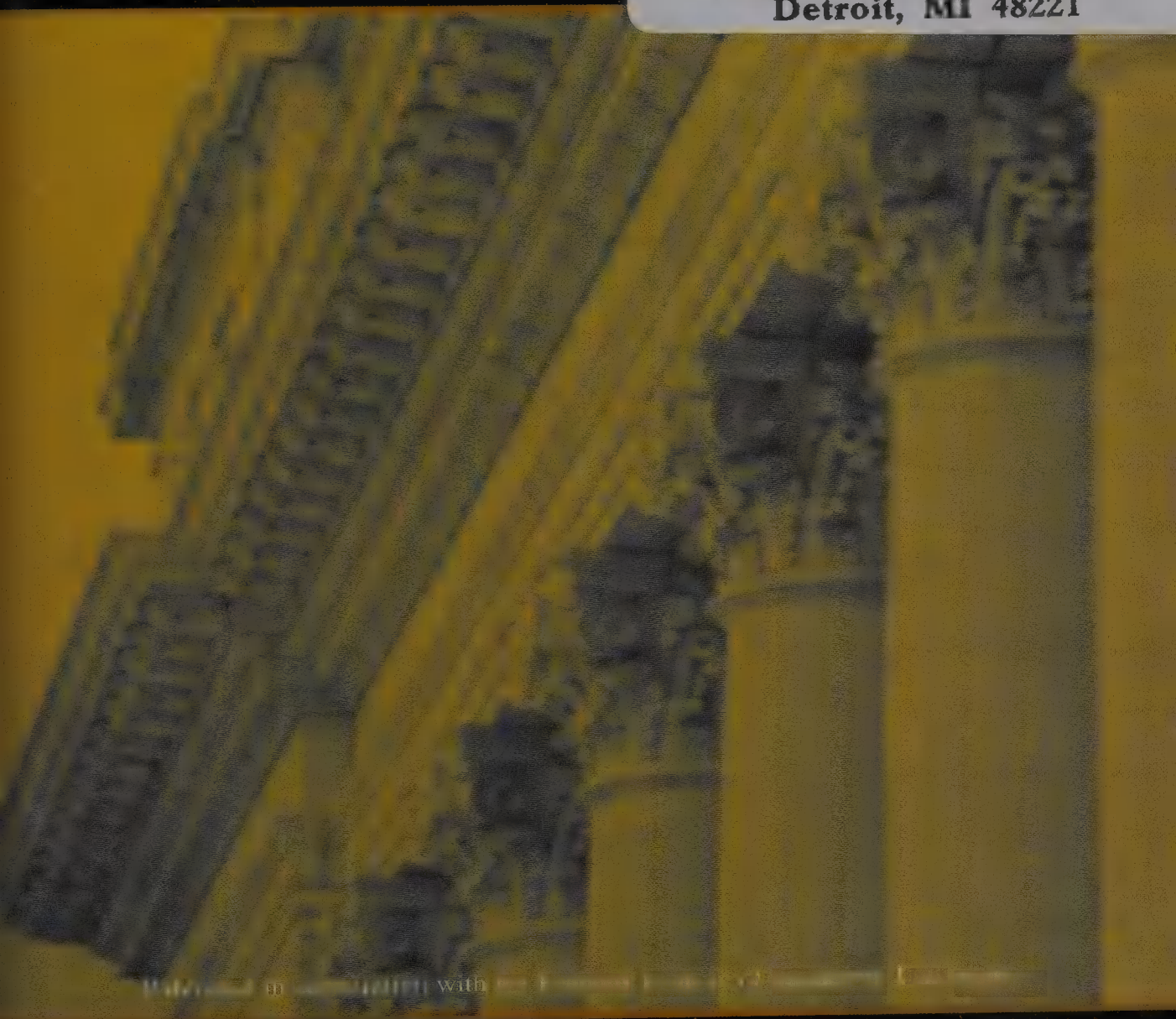
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November 2012

Introduction to the Issue on State Level Education Policy

David G. Sevier

State of Tennessee Board of Education

Education has generally been held to be a state, rather than federal, issue, in large part because the vast majority of public money used to fund education comes from state and local governments. Federal monies usually count as a minority percentage; however, federal policies govern the education landscape in states. It is as if the minority shareholder gets to call all the shots within the company.

This “federal policy as end game” reality is changing quickly. States are finding ways to move away from the constraints of No Child Left Behind (NCLB) and into a world of accountability that better meets the needs of their students. The Obama administration’s waivers to the NCLB law may signal an end to an era of education policy dominated by the federal government. If so, such a change has the potential to fundamentally alter the role of the federal government in public education. NCLB brought about many changes, and the debate will go on for years about which parts of the voluminous law made a real difference for children. One reality, however, is that NCLB created fertile ground for education policy researchers to tackle interesting questions about large-scale interventions and the influence of such interventions on the academic outcomes of America’s children. This research was valuable then and it remains valuable today. The volume of academic work created during the NCLB “pre-waiver” era stands in sharp contrast to the amount of state-level education policy research done during the same period. We are on the verge of seeing a shift toward more and better state-level education policy research—a shift based upon this change of the locus of control and accountability.

Why such a dearth of state K-12 policy research up to this point? Is it simply a lack of interest? Is it considered too provincial? Perhaps, but there may also be legitimate reasons for the lack of research. States are not always equipped to supply researchers with the types of data they need to engage in high-quality research. This can be off-putting and could certainly steer scholars in a different direction. Also, states truly tend to believe that their policies and practices are individualized. This can foster the notion that the research is not easily generalized across similar populations. Last, the funding potential for federal research significantly outpaces the state level research funding opportunities.

Of course, no single piece of research or any single journal issue can serve as the bellwether for a topic as massive as K-12 education policy and governance. This collection of articles is an opportunity to examine the inner workings of several different states and reflect upon the ways

these states are tackling tough issues. The topics are incredibly varied, but the common thread of interest is the attachment to state, rather than federal, policy.

The issue begins with Christopher Harrison and Lora Cohen-Vogel examining the politics of Florida relative to teacher reform. The elimination of tenure and performance pay are topics receiving much interest in many states, and Florida was one of the first states to statutorily address these issues.

One area of K-12 education that holds the most promise is virtual learning. States have vastly different beliefs of the utility of this relatively new way of instruction delivery. Teachers who work in this environment have widely disparate backgrounds and training. Catherine Fisk Natale and Janet Cook examine how several states are addressing this issue by way of teacher licensing policies.

In many states, governors are taking a more active role in K-12 education. Rather than working within established paradigms, many governors are seeking enhanced control that was at one time the purview of state boards of education. Arnold Shober focuses on how this increased gubernatorial pressure on K-12 education has played out in three states.

Meaningful change comes about only when the environment for both policy and implementation transformation is in place. Maida Finch examines Tennessee and the work leading up to the Race to the Top competition. She examines the political context that allowed the state to be well positioned for change.

Many state policymakers would be surprised to know that there are more governance similarities between the U.S. states and Canadian provinces than there are differences. Jennifer Wallner investigates how our neighbors to the north address P-12 education.

Diane Massell, Margaret Goertz, and Carol Barnes explore the ways state education agencies find and use research-based knowledge to drive improvement in the lowest performing schools and districts and how these same types of knowledge play into the strategic decision making within state education agencies.

Finally, Paul Manna ties the issue together with a piece that reflects upon the past and looks toward the future of state level education policy.

I would like to take a brief moment to thank all of the contributors, editors, and publication staff associated with this issue. Likewise, I would like to express my thanks to the *Peabody Journal of Education* for the opportunity to serve as a guest editor. I found this to be a very rewarding experience. I believe we are just beginning to see a dramatic shift in the amount and quality of research dedicated to state level K-12 policy. I think the contributions of this issue will help set a high standard for further research and discussion.

AUTHOR BIO

David G. Sevier serves as deputy executive director of the State Board of Education in Tennessee. As a policy adviser with the State Board, Dr. Sevier primarily works with issues surrounding school reform, curriculum, teacher preparation and licensure, and STEM education. He has previously worked in a number of K-12 roles including teaching instrumental music, physics, and serving as a school administrator. He holds an Ed.D. from the Peabody College of Education at Vanderbilt University.

The Politics of Teacher Reform in Florida: Analyzing Causal Narratives Surrounding State Adoption of Performance-Based Evaluations, Performance Pay, and Tenure Elimination

Christopher Harrison and Lora Cohen-Vogel
The University of North Carolina at Chapel Hill

Following a multiyear debate, Florida lawmakers passed the “Student Success Act” in March 2011, introducing some of the most sweeping educational reforms in the state’s history—the introduction of teacher evaluation systems based on value-added modeling, mandatory “performance pay” for teachers, and the elimination of long-term professional service contracts. Using Stone’s (1989) Causal Stories framework, this article analyzes arguments made for and against these reforms by numerous policy actors. Analysis of transcripts, news coverage, and policy reports reveals that actors on both sides of the debate constructed competing stories regarding the “causes” of poor student achievement. These competing causal narratives were central to actors’ efforts to define the nature of the educative process, identify the “players” who controlled student learning, and portray the proposed reforms as solutions to the problem of underachievement, on one hand, or ill-conceived and poorly targeted answers, on the other.

Propelled by a vigorous and contentious debate over two recent proposals, education reform has again found its place at the top of Florida’s policy agenda. These proposals, Senate Bills 6 and, later, 736, which became law in 2011, put forward ideas for substantively altering the teaching profession in the state. Under the new law, teachers, traditionally compensated through pay scales that reward advanced education or experience, face a new system in which performance-based evaluations drive salary increases. These new systems must base at least 50% of a teacher’s evaluation on their value added to student achievement. In addition, Senate Bill (SB) 736 eliminates the state’s previous policy, which required that districts award “tenure” to teachers after 3 to 5 years of service by offering them long-term professional service contracts (F.S. 1012.33 (e)). Under the new law, all teachers hired after July 1, 2011, are offered annual contracts that expire at the conclusion of each year, regardless of their length of service. Each of these provisions in the new law have engendered powerful reactions from a variety of actors and interest groups across the state and have fostered an ongoing dialogue regarding teaching, learning, and the role of the public school system as an institution.

In this article, we explore the arguments for and against performance pay and tenure reform across several venues, including legislative committee meetings, the floor debate of Florida's General Assembly, and the pages of the state's major newspapers. Specifically, we apply Deborah Stone's Causal Stories framework to examine data from these venues in order to understand how policymakers and advocates used language to influence the debate around state policy on teacher compensation and tenure. Our examination reveals that bill supporters and opponents constructed very different "stories" about the nature of the learning process and the "causes" of poor student achievement. These competing causal narratives were central to actors' efforts to portray the proposed levers of reform—performance pay and tenure elimination—as positive forces for improving student outcomes, on one hand, or ill-conceived and poorly targeted policy, on the other.

By unpacking these narratives, our study extends prior research into the politics of efforts to reform the teaching profession (e.g., Cochran-Smith & Fries, 2001a, 2001b; Cohen-Vogel, 2005; Cohen-Vogel & Herrington, 2005; Earley, 2000) and is among the first to explore the sweeping teacher pay and evaluation reforms that were considered by 10 state legislatures during the 2010–11 session. We investigate the political narratives in the first state of these 10 to enact a three-pronged reform "package" with performance-based evaluation, performance pay, and tenure elimination; several of the remaining states had a narrower focus on teacher evaluation and/or compensation, while Indiana and Ohio joined Florida in eliminating tenure in late 2011.¹

This study also contributes to the policymaking and comparative state politics literatures more broadly. There is agreement in these fields that narrative analysis can help develop our understanding of how policy actors and advocates use language to invest policy with meaning and, ultimately, shepherd a bill to passage (Cohen-Vogel & Hunt, 2007; Edelman, 1985a, 1988; Laver & Garry, 2000; Laver, Benoit, & Garry, 2003; Smith, 2004). In Edelman's (1985b) words, "Stories are among the most universal means of representing human events. In addition to suggesting an interpretation for a social happening, a well-crafted narrative can motivate the belief and action of outsiders toward the actors and events caught up in its plot" (p. 156). Understanding how language is used to build support for particular paths is critical for analysts, researchers, and others who wish to forecast or influence policy trends in education.

In the remainder of the article, we provide a brief description of the backgrounds and major features of SB 6 and 736. Following this, we discuss the conceptual framework and methods guiding our analysis. We conclude with a presentation of our findings and discussion of their implications for state policymaking and its future study.

BACKGROUND

The story of SB 736 began with the introduction of SB 6 in March 2010. Following a period of intense debate, during which teachers from across the state registered their protests in several highly publicized committee hearings, SB 6 passed both houses of the state legislature with

¹According to the Education Commission of the States, 10 states considered or adopted some combination of performance evaluation, performance pay and tenure modification in 2010–11. They are OH, FL, IN, NV, MN, CO, LA, NY, IL, and MI. About half of these states focused on revising their performance evaluation systems, with OH, IN, and NV joining Florida in adopting a performance pay model.

support from an overwhelming Republican majority. The bill ultimately failed to become law, however, as the result of a veto from outgoing governor Charlie Crist. Following SB 6, the political landscape of Florida shifted significantly, as state Republicans strengthened their position in the legislature and Floridians elected Republican Rick Scott, who supported many of the reforms proposed under SB 6, to the governor's office.

SB 736, introduced early in the 2011 legislative session, resurrected the policies put forward by SB 6, with only minor alterations—the most significant of which was the elimination of the requirement that districts set aside 5% of their budgets to support performance pay structures. Following another period of debate and commentary, SB 736 passed through both houses of the state legislature, again along party lines. This time, however, the bill continued to the desk of an enthusiastic executive; Governor Rick Scott signed the “Student Success Act” into law on March 24, 2011.

Both SB 6 and 736 proposed three levers to improve teaching quality in the state: the reconstruction of teacher evaluation systems, teacher compensation systems linked to these evaluations rather than to education and experience, and the elimination of long-term professional service contracts for teachers. Both bills also sought to establish strong links between teacher evaluation and student performance. When it became law, SB 736 mandated that “at least 50 percent of a performance evaluation must be based upon data and indicators of student learning growth assessed annually by statewide assessments or, for subjects and grade levels not measured by statewide assessments, by school district assessments” (Florida State Senate, 2011, p. 8). Based upon these evaluations, under the law, teachers are classified according to four performance categories, which include “highly qualified,” “qualified,” “needing improvement” or “developing” (in the case of teachers in their first 3 years of employment), and “unsatisfactory” (Florida State Senate, 2011).

Although these changes are significant, the most contentious elements of SB 6 and 736 are the dismantling of traditional pay scales and the elimination of long-term professional service contracts. Under SB 736, districts are required to provide annual salary adjustments for instructional personnel and school administrators based upon performance. These annual “salary adjustments” are reserved for teachers achieving highly effective or effective performance ratings. Unlike bonuses or one-time stipends, these “adjustments” are intended to be permanent increases to educators’ base pay (Florida State Senate, 2011). Both bills also disallow the provision of district-level, long-term professional service contracts; instead, under the new policy, educators employed after their probationary period are eligible only for recurring annual contracts. Upon conclusion of an annual contract cycle, districts can choose not to renew contracts without cause (Florida State Senate, 2011).

UNDERSTANDING STATE POLICY ACTION BY EXAMINING CAUSAL “STORIES”

A key element in understanding how the reforms proposed by SB 6, and later SB 736, successfully became law lies with the process of narrative construction or “framing” by actors on both sides of the debate (Stone, 1989). Numerous political scientists (e.g., Baumgartner & Jones, 1991; John, 1998; Mills, 2007; Rochefort & Cobb, 1993; Stone, 2002) assert that actors engaging in the policy-making process “fight *with* ideas as well as about them. The different sides in a conflict

create different portrayals of the battle—who is affected, how they are affected, and what is at stake” (Stone, 2002, p. 34). These competing “stories” then are essential political instruments for shaping alliances and, ultimately, the allocation of benefits.

Discourse analysis serves as a method for understanding and exploring the kinds of competing narratives formulated by actors as they engage in the policy-making process. The competitive nature of policy discourse is highlighted by Fischer (2003), who asserted that “in addition to the dominant discourses, competing discourses struggle to gain recognition and power” (p. 76). Stone (2002) also recognized the competitive nature of political discourse, and asserted that the process by which problems are identified is a particularly active battleground. “Problem definition is never simply a matter of defining goals and measuring our distance from them,” she wrote, “It is rather the strategic representation of situations” (p. 133). Recognizing the link between problem definition and policy solutions, she continued,

Problem definition is a matter of representation because every description of a situation is a portrayal from only one of many points of view. Problem definition is strategic because groups, individuals and government agencies deliberately and consciously fashion portrayals so as to promote their favored course of action. (p. 133)

Others (e.g., John, 1998; Mills, 2007) further delineate the connections between causal stories, problem definition, and policy change. John (1998), for example, argued that political actors use narratives, images and symbols to construct “scientific” causal stories. These narratives then compete to shape policymakers’ perceptions of policy problems; he noted that “the side that wins the scientific and expert argument has its policy preferences satisfied in the form of policy programmes” (p. 157).

In 1989, Stone offered a broad typology for classifying and understanding these competing political narratives. Her framework posited that policy actors construct a variety of “causal narratives” in their efforts to legitimize, or delegitimize, certain issues or policy proposals. Later, she argued that these causal narratives “are origin stories, stories of how a problem came into being” and that, ultimately, “every origin story implies a resolution” (Stone, 2002, p. 134). As such, the ways that actors construct narratives about problems have significant implications for the kinds of policies that may eventually be produced. If successful, causal “stories” may go beyond establishing “the possibility of human control over bad conditions”; they may also assign “blame” to particular actors, resulting in policy actions that constrain or punish their behavior (Stone, 2002, p. 204).

Stone’s (1989) framework articulates four major causal narrative types: the “accidental,” “mechanical,” “inadvertent,” and “intentional” (see Figure 1). Each narrative is constructed from two primary elements—an “empirical” element that defines the *guided* nature of one’s actions and a “moral” element that asserts the *intentionality* of consequences ensuing from those actions. These narratives, according to Stone, are employed by policy actors as they attempt to shift the “story” surrounding a particular problem or issue to one that is “seen as caused by human actions and amenable to human intervention” (p. 281). This process occurs in an arena of contested discourse, as “one side in a political battle seeks to push a problem into the realm of human purpose, [and] the other side seeks to push it away from intent toward the realm of nature” and, thus, not open to policy intervention (p. 292). This contest of “causality” forms a dialectical process in which “blame” for an unfavorable condition may be assigned or deflected, and targets for policy action identified or negated.

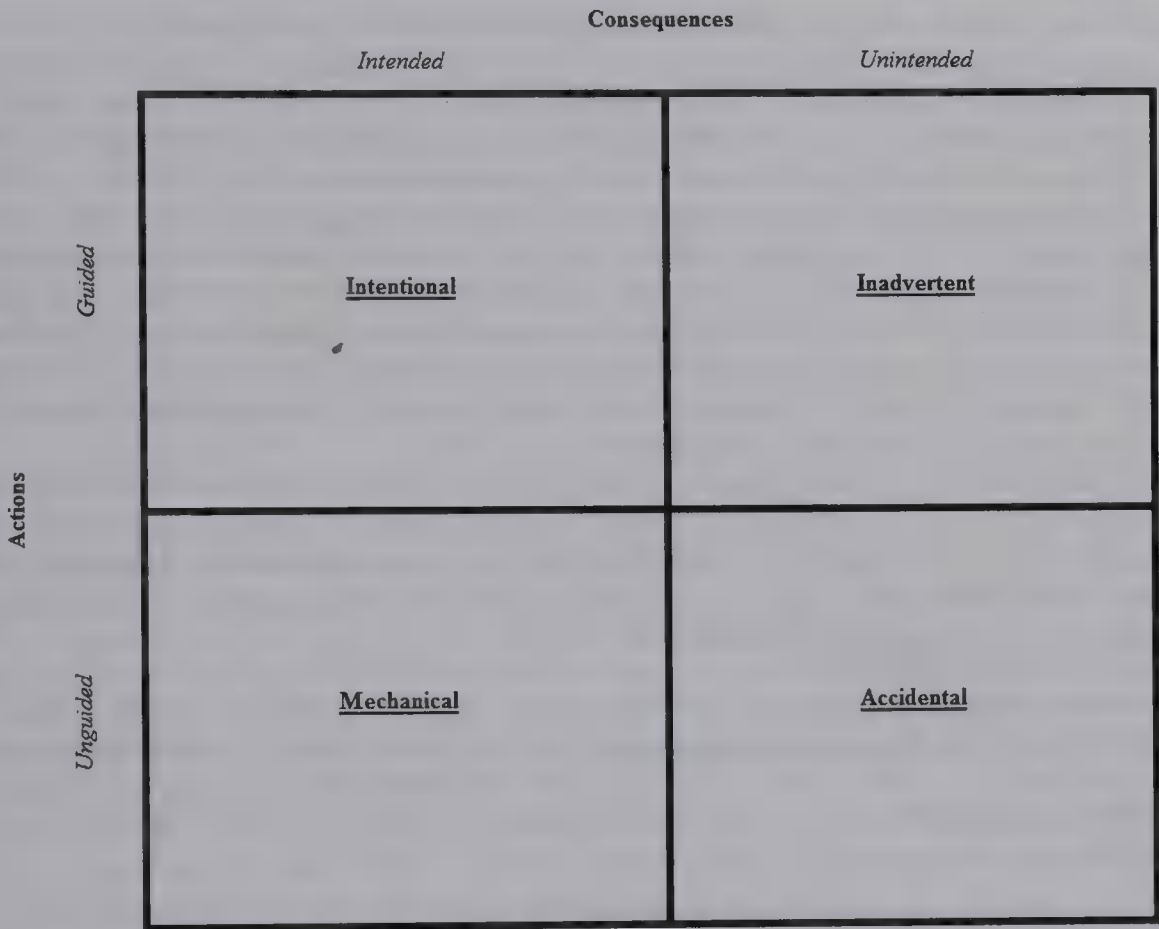


FIGURE 1 Stone's Causal Narrative Typology.

In describing each type, Stone (1989) asserted that two of the narratives are particularly clear and politically efficacious. The first type—the “accidental” narrative—tells a story of *unguided* actions resulting in *unintended* outcomes, and “include[s] natural disasters such as floods, earthquakes, droughts and hurricanes” (p. 284). She argued that “accidental” narratives may be particularly attractive to actors seeking to avoid or deflect “blame” for a policy problem, as they do not construct a causal “story” that frames a problem as resulting from human action or amenable to redress.

The second of the more “powerful” types is the “intentional” narrative, which describes action as *guided* and outcomes as *intended*. Stone (1989) defined this narrative as framing a story of causation “where an action was willfully taken by human beings” (p. 284). When the consequences of those actions are perceived as good, she noted, this is the domain we know as rational action; when the consequences are negative, however, “we have stories of oppressors and victims” (p. 284). This type of “causal story,” according to Stone, also includes conspiracy theories, which argue for “deliberate but concealed human action” (p. 285).

Stone’s framework portrays the second pair of narratives as being less efficacious in motivating policy action. They, instead, often act as a “middle ground” between the two more powerful causal types. The first, the “inadvertent” narrative, results from *guided* action without *intent* on the part

of the actor. Examples include the “harmful side effects of well-intentioned policy” or “problems such as poverty, malnutrition, and disease” (p. 286). Stone asserted that “inadvertence here is ignorance; the consequences are predictable by experts but unappreciated by those taking the actions” and that “these stories are soft (liberal) versions of blaming the victim: if the person with the problem only changed his or her behavior, the problem would not exist” (p. 286).

The final narrative articulated in Stone’s (1989) framework deals with “mechanical” causes. These causal “stories” incorporate “things that have no will of their own but are designed, programmed, or trained by humans to produce certain consequences” (p. 287). She notes that in stories incorporating mechanical cause, “the exact nature of human guidance or control is at issue” (p. 287). Stone turned to malnutrition again to provide an example, referring to “stories” that frame problems engendered by poor diet as the fault of advertising campaigns that “manipulate people into eating junk food and unbalanced diets” (p. 287).

In addition to these “simple” causal narratives, Stone (1989) allowed for “stories” that are more complex than outlined in her framework. These “complex” causal narratives incorporate efforts by actors to frame problems as the result of long-standing historical structures, institutions, or “a web of large, long-standing organizations with ingrained patterns of behavior” (Stone, 2002, p. 195). She argued that within such narratives,

the social systems necessary to solve modern problems are inherently complex. . . . In such complex, interactive systems, it is impossible to anticipate all possible events and effects, so failure and accident is inevitable. Failures also involve so many components and people that it is impossible to attribute blame in any fashion consistent with our cultural norm that responsibility presupposes control. (p. 195)

As such, complex, institutional narratives may be particularly effective for actors seeking to defend themselves from allegations of blame. Stone (2002) noted that

in politics, ironically, models of complex cause often function like accidental or natural cause. They postulate a kind of innocence, because no identifiable actor can exert control over the whole system or web of interactions. Without overarching control, there can be no purpose and no responsibility. (p. 196)

Again, as actors construct these narratives, they do not simply coexist within the discursive space—rather, they “push” and “pull” against one another, as policymakers attempt to reframe problems in ways amenable to their agenda. Stone (2002) described this as narrative “combat,” arguing that

as one side in a political battle seeks to push a problem into the realm of human purpose, the other side seeks to push it away from intent back toward the realm of nature, or to show that the problem was intentionally caused by someone else. (p. 198)

Ultimately, she asserted, “finding the true or ultimate cause of harms in these policy areas is not what is at issue. Rather, the fight is about locating moral responsibility and real economic costs in a chain of possible causes” (p. 207). Victory in this contest, and the assignment of fault and responsibility that it represents, has real implications for policy action. A winning narrative allows participants and audiences to envision potential choices, appropriate targets for policy action, and the rationale for changes in policies and governance structures (Mills, 2007).

DATA AND ANALYSIS

The policy positions of political actors and the reform narratives they construct can be extracted from political texts and speeches (Laver & Garry, 2000). According to Laver and colleagues (2003), “political texts are the concrete by-products of strategic political activity and have a widely recognized potential to reveal important information about the policy positions of their authors” (p. 311). To identify the opponents and proponents of reform and their arguments for and against the Student Success Act, we collected “text and talk” as actors engaged in debate around the bills. First, using Florida’s Online Sunshine system (see Table 1), we acquired recordings of the legislative committee meetings and floor proceedings during which SBs 6 and 736 were discussed. We then collected and transcribed these recordings (both audio and visual). Second, we conducted a search for articles published in four of Florida’s major newspapers—the *Tallahassee Democrat*, the *Orlando Sentinel*, the *St. Petersburg Times*, and the *Palm Beach Post*. We chose these papers due to their status as major news sources in their respective regions of the state. Each newspaper maintains an electronic archive of published stories, which we searched for relevant articles using specific terms, including “Senate Bill 6,” “Senate Bill 736,” “merit pay,” and “teacher tenure.” We constrained our results to periods spanning the legislative sessions in which the bills in question were debated: 01/01/2010–05/01/2010 for SB 6, and 01/01/2011–05/01/2011 for SB 736.² We read the abstracts of articles resulting from those key word searches and retained those that referenced Senate Bill 6, Senate Bill 736, merit pay, and/or tenure elimination. Our review resulted in an initial pool of 65 sources.

We then read these sources in their entirety. Newspaper articles not containing quotes (e.g., from policy actors like legislators or concerned citizens) were discarded, resulting in a final pool of 40 articles for analysis (see Table 1). Document excerpts reproduced in the findings section of the article are followed in parentheses by a document and paragraph number. Document numbers refer to specific articles or printed letters listed in the table. Paragraph numbers indicate where in the referenced document the excerpt can be found.

Using directed content analysis (Hsieh & Shannon, 2005), we analyzed the seven legislative hearings and 40 media articles. The dimensions of Stone’s (1989) framework served as a priori codes during the initial stages of analysis (Miles & Huberman, 1994). These codes identified actor’s attempts to describe public education and students’ learning, in particular, as *guided* or *unguided* processes, in accordance with the “empirical” element of Stone’s (1989) typology. We also included codes for identifying the “moral” elements of potential narratives, which helped us establish outcomes as *intentional* or *unintentional* on the part of actors. At the second stage of analysis, we added codes to identify problems identified by actors (e.g., *student achievement*, *teacher performance*, *contextual issues*, and *funding*) as well as the solutions to which the problems were paired (e.g., *performance pay*, *performance-based evaluation*). Codes were also developed to identify an actor’s expressed “stance” for SB 6 and/or 736 (i.e., “support” or “oppose”) and to catalogue emerging narratives not accounted for within the a priori coding framework. Finally, we added codes for document type, document author, and year of publication/presentation.

²Although the legislative session in Florida typically begins in late March, our search window was expanded to catch any policy talk regarding anticipated legislative action prior to session.

TABLE 1
Media Documents and Legislative Hearings Analyzed

Media Sources			
No.	Title	Publication	Date
1	Why Teachers, Districts Clash over Merit Pay	<i>Orlando Sentinel</i>	01/24/2010
2	Merit Pay? Teachers Only as Good as Their Students	<i>The Palm Beach Post</i>	03/18/2010
3	Merit Pay Bill Heads to Senate Floor	<i>Orlando Sentinel</i>	03/19/2010
4	Teacher Pay, Security would Be Tied to Tests Under Senate Bill	<i>The Palm Beach Post</i>	03/19/2010
5	Florida Senate OKs Merit Pay, Tougher Graduation Rules	<i>Orlando Sentinel</i>	03/24/2010
6	Senate Ties Pay for Teachers to Students' Scores	<i>The Palm Beach Post</i>	03/25/2010
7	Michael Rychlik: This is Not a Great Time to be a Teacher	<i>The Tallahassee Democrat</i>	03/26/2010
8	Susan Vinson – SB6 Has Many Questions and Offers Few Answers	<i>The Tallahassee Democrat</i>	03/26/2010
9	Florida May Become First State to Implement Merit Pay for Teachers	<i>The Tallahassee Democrat</i>	03/27/2010
10	Voices For, Against Merit Pay	<i>Orlando Sentinel</i>	03/27/2010
11	John Thrasher: SB 6 is About Performance, not Politics	<i>The Tallahassee Democrat</i>	03/29/2010
12	Make Teacher Evaluations More Objective, Fair	<i>The Palm Beach Post</i>	03/31/2010
13	Time to Rate Teacher Effectiveness by Student Outcome	<i>The Palm Beach Post</i>	04/04/2010
14	Letters to the Editor	<i>The Palm Beach Post</i>	04/04/2010
15	It's About to Become a Nightmare	<i>The Palm Beach Post</i>	04/06/2010
16	Letters to the Editor	<i>The Palm Beach Post</i>	04/08/2010
17	House Continues Heated Debate on Merit Pay	<i>The Tallahassee Democrat</i>	04/08/2010
18	Nation Watches State Push for Merit Pay	<i>The Palm Beach Post</i>	04/11/2010
19	Crist has More Problems with SB 6 but Still Won't Say...	<i>The St. Petersburg Times</i>	04/13/2010
20	Educators Ask Crist to Veto Merit Pay	<i>The Tallahassee Democrat</i>	04/13/2010
21	Letters to the Editor	<i>The Palm Beach Post</i>	04/14/2010
22	Senate Bill 6 Rewards Great Teachers with Higher Salaries	<i>The St. Petersburg Times</i>	04/14/2010
23	Pons Thanking Crist for Vetoing Teacher Merit-Pay Bill	<i>The Tallahassee Democrat</i>	04/15/2010
24	Crist Vetoes Merit Pay	<i>Orlando Sentinel</i>	04/16/2010
25	Scott's Advisor – Place Students before Teachers	<i>The Palm Beach Post</i>	01/07/2011
26	Florida Teachers Feeling the Squeeze	<i>Orlando Sentinel</i>	02/03/2011
27	Changes in Teacher Pay, Tenure are Coasting through Florida House	<i>The St. Petersburg Times</i>	02/13/2011
28	Teacher Merit-Pay Bill Races Toward Passage in Florida Senate	<i>Orlando Sentinel</i>	03/09/2011
29	Florida Senate Drops Tenure for Teachers	<i>The Palm Beach Post</i>	03/11/2011
30	Senate OKs Bill on Merit Pay, Tenure	<i>The Tallahassee Democrat</i>	03/11/2011
31	Under Merit Pay Cloud, Teachers Ponder Future	<i>The Palm Beach Post</i>	03/15/2011
32	House Passes Merit Pay Bill	<i>The Tallahassee Democrat</i>	03/16/2011
33	Teacher Tenure bill Headed to Gov. Rick Scott's Desk	<i>The St. Petersburg Times</i>	03/16/2011

TABLE 1
Media Documents and Legislative Hearings Analyzed (*Continued*)

Media Sources			
No.	Title	Publication	Date
34	House Passes Landmark Bill	<i>The Palm Beach Post</i>	03/17/2011
35	Letters to the Editor	<i>The Palm Beach Post</i>	03/19/2011
36	Uncertainty Fuels Debate over Merit Pay	<i>The Palm Beach Post</i>	03/20/2011
37	Gov. Scott Signs Teacher Merit-Pay Bill	<i>Orlando Sentinel</i>	03/24/2011
38	Gov. Scott Signs First Bill – Sweeping Teacher Pay, Tenure, Evaluation Overhaul	<i>The St. Petersburg Times</i>	03/24/2011
39	Letters to the Editor	<i>The Palm Beach Post</i>	04/02/2011
40	Letters to the Editor	<i>The Palm Beach Post</i>	04/15/2011
Legislative Hearing Transcripts			
No.	Title		Date
41	Florida House of Representatives: Pre K-12 Policy Subcommittee Meeting		03/25/2010
42	Florida House of Representatives: Education Policy Council Meeting		04/05/2010
43	Florida Senate: Education Pre K-12 Committee Meeting		02/09/2011
44	Florida Senate: Education Pre K-12 Committee Meeting		02/10/2011
45	Florida House of Representatives: K-20 Competitiveness Subcommittee Mtg.		02/23/2011
46	Florida Senate: Floor Debate		03/10/2011
47	Florida House of Representatives: Floor Debate		03/16/2011

FINDINGS

Supporters: Constructing an Inadvertent Causal Narrative

Through their legislative testimony, floor debate, comments, and letters to the mainstream media, supporters of merit pay and tenure reform in Florida constructed a causal story about the nature of public education that framed student outcomes as a direct result of teachers' actions, albeit an *inadvertent* one. In terms of the first element of this narrative, proponents of Senate Bills 6 and 736 constructed an understanding about student performance that situated it as a *guided* action on the part of classroom teachers. Proponents used this framing to assert that learning was simply a function of putting the right people in front of students, and policies like pay-for-performance would get them there.

Adam Peshak, a representative of former governor Jeb Bush's Foundation for Florida's Future, articulated the narrative in his testimony before the Florida House, asserting that

a teacher can't control what a student knows on the day he enters the classroom, but they have control over what that student learns in the year that they're there . . . students should be making gains regardless of their income level, regardless of where they live, regardless of their home life. (41)

Representative Erik Fresen, introducing the House version of SB 736, emphasized the role of teachers in the learning process as he explained the bill's purpose:

As lawmakers we strive every day to make sure that children receive a quality education that prepares them for a career in the 21st century. Now, irrespective of the side of the aisle that you sit on, and

no matter what kind of data or studies that you read, this is one thing that is conclusive on all sides about all educational research—and that is that teacher effectiveness is the most influential school level variable that determines student learning. A student's growth—a student's success—is directly tied in to a teacher's effectiveness. (47)

Florida senator John Thrasher articulated a similar stance in a letter published by the *Tallahassee Democrat*, in which he argued that “teachers can’t control what their students know when they show up on the first day of school, but they do influence what they learn during the year in their classrooms” (11, para. 7). With the responsibility for student learning gains squarely on teachers, he was able to forward the “logical” solution: promoting policies to help recruit and retain high performing teachers. According to the senator, “Education is about recruiting the best and the brightest to provide our children with world-class instruction that will allow them to compete and succeed in a global economy” (32, para. 9). Continuing, he wrote, “We have some outstanding teachers . . . and we have some who are underperforming who are being paid at the same level as those highly performing” and that the key to improving the state’s schools lay with changing the “way we recruit, retain and reward outstanding teachers” (11, para. 9). Timothy Farmer, a former teacher from Jacksonville, agreed, arguing before the K-20 Competitiveness Subcommittee of the Florida House:

It’s been said here today, several times, that ‘as a teacher, I can’t motivate my students to do their homework, I can’t motivate my students to come to class, I can’t motivate my students.’ Then what are you doing? Not only should that be expected, that should be what you wake up every day trying to do. I never made excuses for my students—I had homeless kids. I actually taught intensive reading, so I had all the kids that had failed the FCAT the year prior. But guess what? We never made excuses. I did the best that I could. I did my best to inspire those kids to do their best. But, at the end of the year, when my students grew nearly 2 years on their FCAT, I got the same increase as every other teacher in Florida . . . it’s not fair. (45)

Others—both within and outside the state—described performance pay as a primary mechanism for ensuring teaching quality. Michelle Rhee, quoted by the *Palm Beach Post* during an event with Florida governor Rick Scott, averred that “what’s right for kids is having the most effective teachers in the classroom, and in order to attract and retain the best talent you have to recognize and reward them” (25, para. 15).

Indeed, proponents of both bills drew the line from the causal “story” of student achievement to performance pay for teachers time and again. Actors, like Senator Don Gaetz, who asserted the *guided* nature of teachers’ actions in the classroom as the primary causal mechanism of student learning problematized a broken teacher evaluation and compensation system: “The best teachers in the best school district in Florida are valued and compensated about the same as the worst teachers in the worst school district in Florida” (10, para. 1). Representative Erik Fresen argued that Florida’s system for evaluating teachers required an overhaul:

Obviously something is flawed in the manner in which we are evaluating and assessing teachers. If we have a system that is saying that 99.9% of teachers are effective, yet there’s a huge disconnect between that and learning gains, we’re doing ourselves a disservice and we’re doing our children a disservice. But, more important, we’re probably doing the teaching community itself a disservice because there is no methodology right now to actually be able to determine and to tie in what a teacher is evaluated or assessed at and the actual learning gains of that student. (47)

Fresen argued that ineffective evaluation and compensation systems therefore needed to be replaced; in the words of the executive director for Jeb Bush's education policy foundation, "Pay teachers more whose students learn more" (10, para. 3). Former governor Jeb Bush agreed in a letter published by the *St. Petersburg Times*, stating that "thousands of teachers across Florida overcome tremendous challenges faced by their students—poverty, lack of parental involvement, an unstable home life—to ensure their students learn a year's worth of knowledge in a year's time" (22, para. 11). As a result, he urged readers that "if you believe all children can learn and that great teachers deserve to be rewarded with higher salaries, then please support Senate Bill 6" (22, para. 14).

The second element of the causal narrative woven by the bills' proponents established student performance as an *unintended* outcome of teachers' actions. Here "negligent" or "lazy" teachers were framed as impeding student growth. The actors weaving this narrative, however, did not go so far as implying that the harm these teachers caused was intentional, or that teachers' intentions were malign. Negligent and ineffective teachers were, however, portrayed as being protected by an antiquated tenure system, which reformers argued stood in the way of progress.

Supporting the notion that a "broken system" protects incompetent educators, one teacher testified before a House Committee on K-12 Competitiveness:

Personally, I really wouldn't care how much my doctor loved being a doctor. If he was killing patients, I'm not going to see him. It doesn't matter if you love teaching, if you're not any good at it, I'm sorry, our students' education is just too important to let you continue in the classroom. (45)

Senator Don Gaetz further challenged the "tenure" system, calling it "morally wrong." Arguing before the Florida Senate, he said:

When you say that we shall take a teacher whom we know is marginally effective or ineffective—we know it from years of data, we know it from the principal's observations, we know it from what the teachers from across the hall know and say about that teacher—and we will take that marginally effective or ineffective teacher, and place that teacher into a classroom with children who have a right to learn, a right to an education guaranteed by the Florida constitution. When we do that, when we place that teacher in that classroom, then we are saying that that teacher's property right to a job is more important than those students' constitutional right to an education. That is morally wrong, and we cannot do it anymore. (46)

Several other actors articulated a similar narrative, constructing poor student achievement as an unintended result of incompetent or negligent teaching. Representative Paige Kreegel, for instance, was quoted in the *Tallahassee Democrat*, saying, "Tenure means that no matter how bad you are, once you've been teaching three years, unless you commit some heinous crime, you can't be fired. . . . Tenure means never having to say you're sorry" (17, para. 6). Senator Evelyn Lynn went further in her characterization of the "negligent" teacher, asserting in the *Orlando Sentinel*, "I don't want a teacher remaining in the classroom because she has tenure, and she's sleeping half the time" (10, para. 3). A concerned citizen, in a letter to the *Palm Beach Post's* editor, drew a sharp contrast between "good" and "bad" teachers, asserting that:

having had four children and nine grandchildren attend schools in two South Florida counties, I observed, as I am sure many other parents and grandparents have, that there are very good and very poor teachers. The competent ones are self-motivated, dedicated professionals, and the others are hangers-on until pension time. (39, para. 2)

Those “negligent” teachers whose poor performance led to *unintended* lapses in achievement, as Representative Joe Negron argued in his letter to the *Palm Beach Post*, were construed as a “blight on the profession” who “should be dealt with and . . . removed if they’re not performing” (13, para. 6). The elimination of tenure would, if implemented, make doing so significantly easier. Michelle Rhee further emphasized the importance of dismantling long-term contracts in her testimony before the Florida Senate:

Once a teacher has tenure in most states, that essentially means that they have a job for life, regardless of performance, making the practice of tenure a barrier to separating teachers who are ineffective and unable to improve. As much as we acknowledge and reward effective educators, more parents and educators agree than disagree that it should be virtually impossible for an ineffective educator to remain in the classroom. . . our policies must reflect that even after just one year, an ineffective teacher can set a child behind for years to come. (43)

In sum, proponents of Senate Bills 6 and 736 used an inadvertent causal narrative to construct their argument of support. We found no evidence that they attempted to construct causal stories of the other three types described by Stone’s (1989) framework. There was no evidence, for example, that supporters expressed a belief that poor student achievement was an *intended* outcome of teachers’ actions in the classroom. Similarly, supporters were clear in their conception that the causal processes producing student outcomes were guided by actors—teachers, in this case—and, thus, could not be attributed to the “mechanical” or “accidental.”

Opponents: Constructing a Complex Narrative

A variety of actors, from teachers to policy entrepreneurs, opposed the reforms put forward by SB 6 and SB 736. In doing so, they wove a considerably different story about the causes of student achievement than did bill proponents. Despite this fact, the individual elements of their causal story fell within the same constituent categories of Stone’s (1989) typology. As in proponents’ narratives, student achievement was depicted by bill opponents as the result of *guided* action, leading to often *unintended* consequences. Those standing in opposition to the bills, however, diverged from proponents by situating teachers as only one of many actors in a complex system responsible for student achievement. Within this system, they argued, the locus of control resided with numerous other actors, including politicians, parents, and students. As such, teachers’ intentions regarding learning outcomes were often subordinate to the choices made by other actors who, in turn, were constrained by often challenging home lives and socioeconomic factors.

Andy Ford, the president of the Florida Educator’s Association, emphasized the importance of external actors in the learning process in his testimony before the state legislature, arguing that “the classroom teacher has very little control over input. Think about it. The legislature, school board, or administrators control funding, curriculum, textbooks, standards, assessment, student–teacher ratio, and student assignment. And those things greatly impact instruction and learning” (43). In arguments before the Florida House, Representative Scott Randolph emphasized the role of other actors in the production of student outcomes:

Will the doctors in the house take responsibility right now for the 97% of activities that his patients engage in outside of his office? It could be that some things, no matter how good of a doctor [you

are], are simply out of your control? . . . We're telling the teachers that they are only as good as the random student that walks in their classroom door. Never mind, as the Seminole County teacher of the year wrote to me: 'There are learning discrepancies, there are unstable home lives, there are prior learning experiences.' Never mind the 30 days of school that they miss. Never mind that the policies of this Legislature have led to parents holding down three jobs to make ends meet. Never mind that the policies of this Legislature have the child coming into the classroom hungry. (47)

Opponents of performance pay and tenure reform implicated parents and students as being particularly important in the learning process. Representative Maria Sachs, for instance, highlighted the importance of parents' actions in determining the success of their children:

I am not convinced that we have failing students because of teachers. I think we might have a problem with our children staying in school maybe because of us parents. Maybe we're working too long hours, and don't spend enough time with the kids (42).

One teacher, testifying before the House, asserted that students themselves were responsible for underachievement:

I've been hearing a lot today about holding teachers accountable for student scores. I haven't heard anything about holding students accountable. . . . Every year, I proctor the FCAT. . . . I see students who just glance at the reading passages and then just mark any old answer. Some of them take a guess, but too many of them do not care about this test that I am going to be evaluated on. You ask them, 'I noticed you didn't take much time on the test. You looked at it for about 10 minutes and then sat there with your head down for the next hour' and they'll say 'Well, it was boring.' I just don't see how I am going to survive in a career where I'm being evaluated for students who don't care. (42)

The opposition's efforts to push the locus of control over classroom learning outward were expressed in statements to the media as well. Senator Paula Dockery, for example, argued in a letter published by the *Palm Beach Post* that SB 6 was flawed because "it takes a blame-the-teacher approach instead of recognizing that individuals have personal responsibility for their decisions and behaviors. The bill fails to hold parents or students responsible for their own roles in the education process" (16, para. 6). Michael Rychlik, a concerned teacher, agreed arguing that:

what teachers don't have control over is student and parent behavior. Teachers can't make students care about their education; they can't force them to regularly attend school; they can't make them do their assignments or get them to adequately study outside of school. And teachers certainly have no voice in how parents raise and support their children. (07, para. 8)

Another teacher questioned the assertion that teachers were the critical contributor to students' achievement:

This bill implies that the teacher is the most important factor in a student's education, and that's not true. It disregards that middle and high school teachers have their students for 4% of the day. The most important factor in a student's education is their parents, their home life, and their socio-economic status. It matters not how good a teacher is in a classroom if students don't read, they don't do their homework, and they don't study for tests. (42)

Many participants in the media dialogue over merit pay and tenure reform, like one concerned parent writing to the editor of the *Palm Beach Post*, asserted that regardless of a teachers' desire for students to excel, they faced long odds; he shared that his daughter, a teacher, had:

been beaten and battered (one girl who struck her was 6 feet tall and weighed over 200 pounds) and suffered other indignities that many of the “regular” teachers wouldn’t tolerate. My daughter doesn’t complain because, often, she sees progress in her students and feels that there is no other job that she would rather have. . . . Now, the Legislature is talking about merit pay, with all pay raises based on student performance and progress determined by the results of a standardized test. Many of my daughter’s students never will be able to pass any kind of standardized test. Does that mean that she will not ever receive a merit pay increase? (21, para. 10)

Although opponents of the bills did construct causal “stories” that assigned responsibility for student performance to a wide number of actors, many recognized that these additional “players”—students and parents, primarily—were themselves mired in circumstances that bounded their choices and agency. One frustrated teacher, for example, asserted that “what you don’t see, many of you, is what I see in the classroom. What you don’t see are kids failing—not because the teacher isn’t trying, but because the support systems aren’t there for them” (42). A representative of the Lake County Education Association said:

The thing that I was concerned about when I was reading your bill was that you left off socioeconomics. . . . Some of our children might be living in shelters; they might be living in cars, the woods. They might be living with other families . . . in very crowded conditions. And when they’re in those crowded conditions they may be sleeping on somebody’s couch, on the floor of the living room, they don’t have a quiet place to study [or] access to a computer. (43)

Representative Rick Kriseman expressed these concerns more figuratively, arguing that:

this bill is akin to a surgeon who is treating a patient with a fractured skull, a punctured lung, two broken legs, and a burst spleen by just removing the spleen and still expecting a successful outcome. The problems with the learning environment are much more than just bad teachers—and many of them are solvable by us. (47)

The narrative forwarded by opponents of the bills—one that distributed responsibility for student achievement across multiple parties—created a tension with proposed reforms like merit pay, evaluation systems based on student achievement, and annual contracts. One teacher quoted by the *Palm Beach Post* said that although “I love Palm Beach Central and I’m very happy there . . . I can’t risk my livelihood over factors I have no control over” (31, para. 7). Others worried about the proposed reforms for 1st-year teachers in particular:

It’s going to hurt not only myself, but also my first year teachers. Especially with the middle school population, they have a lot more difficulties than I do. They wouldn’t meet any scores, and they would be fired. They are darned good teachers, the first-year teachers, and it’s not their fault. (43)

In debate before the Florida Legislature, proponents of merit pay and tenure reform responded to opponents’ efforts to shift of the locus of control over the learning process by reasserting the importance of teachers in student achievement. Representative Janet Adkins, for example, argued that “research shows that establishing high expectations for all students results in high rates of academic success. I personally believe the higher the expectation, the higher the performance” (47). Her response, focusing on revisions to the teacher evaluation system, continued with a concern for equity and the tyranny of low or unequal expectations:

Why would we want to include socioeconomic factors in the student learning growth formulas? The value-added model already takes into consideration the learning history for each student. Members, there is no need to double count this. To do so would lower the expectations for these students and increase the achievement gap for minority and low-income students. (47)

Representative Don Gaetz pushed back more forcefully, reestablishing the primacy of the teacher role in student achievement:

You know, my skin crawls when I hear people say that ‘tough circumstances’ should justify poor performance. . . . Members, I don’t know when it became unacceptable to acknowledge that we have ineffective teachers. We have ineffective doctors, we have ineffective lawyers, ineffective engineers. Somehow, we can’t say that there are ineffective teachers. . . . Members, we have institutionalized mediocrity and this good bill changes that for the better.(47)

Overall, opponents of SB 6 and 736 countered proponents’ relatively straightforward causal “story” by constructing a much more complex causal narrative, the constituent parts of which largely fell within the boundaries of the inadvertent narrative described by Stone. The complexity inherent to this causal “story” was engendered by opponents’ efforts to locate the locus of control over student outcomes among multiple actors who themselves were part of a broader, broken, and somewhat intractable system. We found no evidence that opponents perceived the causal mechanism in question as being mechanical or accidental in nature. In fact, opponents were clear that there were actors whose decisions and actions guided the learning process. Similarly, we found no evidence of an intentional narrative among opponents.

DISCUSSION

Actors on both sides of the debate over performance pay and tenure reform in Florida were highly evocative in their construction of “causal stories.” Proponents of SB 6 and 736 conveyed the argument that student achievement was a direct result of access to a “quality” teacher. Within this frame, poor student achievement was largely constructed as the *guided* but *unintentional* product of negligent, or potentially ignorant, teachers. This combination of elements places it within the realm of the *inadvertent* narrative described by Stone (1989). Under this narrative, efforts like performance evaluation and performance pay were valued as appropriately targeted policy instruments. By the same token, policies like tenure elimination that would ease the removal of teachers who do not “make the grade” were also seen as necessary.

Opponents of the reforms proposed by SB 6 and 736 painted a different picture. Their narrative conceived of education as a multifaceted process, dependent upon the actions and choices of a number of actors not just classroom teachers. This *complex* causal narrative, as Stone would call it, retained the same basic elements of the story told by supporters—that student achievement resulted from the *guided* actions of individuals, and positive and negative outcomes were not *intentional* on the part of actors involved. The dividing line between the two narratives concerned the locus of control. The complex narrative constructed by opponents distributed “blame” for poor student achievement among a diverse set of actors. Without a clear “target” then, performance pay and the elimination of tenure were framed as “punishing” well intentioned teachers who were victims of the same broad system that was failing their students.

Our study extends Stone's Causal Stories Framework by showing how politicians and policy advocates may seek to push policy discourse outside of boundaries of the four narratives. In this case, actors opposed to SB 6 and 736 did not attempt to shift the discourse into the realm of the "natural," for example, but instead worked to relocate the locus of control and disperse responsibility for student achievement to a wide set of school and nonschool actors. Stone (1989, 2002) allowed for the possibility of "other" narrative types, to an extent, in her description of "complex" narratives. What she does not do explicitly, however, is discuss how a shift in the locus of control or an expansion of the locus of control to multiple actors, in particular, is a strategy some policy actors may use in an attempt to disrupt a counternarrative that depends critically upon vesting responsibility for a problem or condition with one individual group. To that end, our article makes a theoretical contribution.

The contesting dominant narratives documented herein overshadowed two other minor narratives that also characterized the debate, though to a much lesser degree: teacher professionalization and the "business" of schooling. First, opponents in Florida worried about the ways in which merit pay and tenure reform would de-professionalize teaching. According to Representative Franklin Sands, for example:

To all of those listening, I say 'Please mark your calendars because today is truly a day of infamy in Florida's history. For today is the day this bad bill turns Florida into an educational wasteland.' . . . There was a joke in the 19th century where one boss was asking another about how he motivated his employees to which the other replied 'If the employee does his job really well, I let them keep it.' This Republican-sponsored bill doesn't even do that. You essentially fire every teacher each year. By your actions, during this session, you are not only demeaning and devaluing our teachers, you are also, by extension, doing great harm to Florida's children. (47)

Representative Cynthia Stafford agreed, asserting:

This bill says that we do not care about our teachers. Teachers in Florida are some of the lowest paid in the nation. [With] the low pay, coupled with this proposed overhaul, one must ask 'Why would a teacher want to come to Florida and teach, and why would a teacher want to stay?' (47)

The second minor narrative to emerge from the debates was invoked by supporters of tenure reform and merit pay. The school system, in this story, should operate like a private sector business. Ryan West, a representative of the Florida Chamber of Commerce, argued, "Just like in the private sector, you have to assess and evaluate achievement to truly gauge if you're operating at peak performance." The proposed reforms would work, he argued, because they injected "common sense [and] market based principles" into the state's school system (45). Representative Marlene O'Toole also worked to construct this narrative, arguing:

I hear, 'How are we going to help those teachers that need help?' Well, they need to do a little help of their own. I mean there's some personal responsibility. In the business world, you know who your competition is. You know what you have to do to be number one. And so as we look at this bill, we have to look at it in a business light because it is a business and the business is educating children. (47)

As performance-based evaluation, performance pay, and tenure elimination policies continue to proliferate across the nation, future studies might consider whether these, or other minor narratives, are constructed by policymakers and other actors. Additional research may also take a

comparative approach and examine whether the dominant causal narratives forwarded by proponents and opponents hold from state to state or change over time. Researchers might also explore whether contrasts exist in the ways that interest groups and politicians themselves construct and evaluate arguments for teacher reform. Cohen-Vogel and Hunt (2007) have documented differences in how policy advocates and policymakers construct meaning in the teacher preparation debate, arguing that these distinctions underscore the different roles that these actors play in the larger political system. Advocates on both sides of that debate use language to construct warrants in favor of their policy preferences and larger worldviews, and they also work aggressively to undercut the ideas and legitimacy of their opponents (Cochran-Smith & Fries, 2001b). Policymakers involved in the debate over teacher preparation, however, appear less enthusiastic than advocates to “discredit the ideas, intentions, and evidence of those who hold opposing views, perhaps because they fear marginalizing a large constituency group (e.g., teachers), mobilizing opposition, or diverting attention away from their own favored courses of action” (Cohen-Vogel & Hunt, 2007, p. 157). Examining the extent to which these differences exist in the narratives used by advocates and policymakers in the debates over performance pay and tenure elimination would help to test whether the cleavages found by Cohen-Vogel and Hunt exist beyond the teacher preparation issue.

Finally, scholars might look outside of Florida to consider whether and to what extent research plays a role in teacher reform narratives. As they constructed their causal “stories” in Florida, few actors attempted to support their narratives by referring to empirical evidence, despite the release of a major study prior to the start of the 2011 legislative session by the National Center on Performance Incentives that found no significant effect of performance pay on students’ test performance (Springer et al., 2010). The Florida experience appears to contradict Henig’s (2008) claims that political actors are “quick to grab” research findings in order to assert “confident claims attached to convincing narratives” (p. 224). He noted that “failure to do so would be seen by both allies and opponents as a sign of amateurishness or inattention” (p. 225). Other researchers might delve into reasons why evidence did not play a greater role in narrative construction in Florida, asking whether the highly charged nature of the debate contributed to an environment in which “reasoned, textured, pragmatic, and contextual analysis” was, in Henig’s (2008) words, “drowned out against a background racket of ideological and partisan noise” (p. 13).

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Virtual K–12 Learning: New Learning Frontiers for State Education Agencies

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This article explores the role of state education agencies in three states that have embarked on ambitious kindergarten through Grade 12 (K–12) virtual learning initiatives: Alabama, Florida, and Idaho. Subject to a rapidly changing environment influenced by factors beyond the jurisdiction of many state departments of education, the world of virtual K–12 education is relatively unregulated and fluid. Case studies describing the virtual learning initiatives of several states suggest that few, if any, state education agencies are currently equipped to regulate the rapidly growing number of independent for-profit and nonprofit organizations delivering online learning options.

State education agencies (SEAs) and their leaders currently face unprecedented demands. State education officials must grapple with turning around low-performing schools, improving teacher evaluation systems, implementing school improvement initiatives, and creating comprehensive longitudinal data systems. All of these tasks often occur under the scrutiny of the media spotlight (Brown, Hess, Lautzenheiser, & Owen, 2011). It is in this context that this article explores the role of SEAs in three states—Alabama, Florida, and Idaho—that have embarked on ambitious kindergarten through Grade 12 (K–12) virtual learning initiatives. These three states were chosen because of their comprehensive yet different approaches toward promoting online learning for K–12 students, as well as the unique political landscapes that have shaped the roles of the SEAs in these states. Subject to a rapidly changing environment influenced by factors beyond the jurisdiction of many state departments of education, the world of virtual K–12 education is relatively unregulated and fluid. There is growing recognition that policies often lag behind practice and that oversight and regulation are important to ensure that students and the public are well served by virtual K–12 education (Barth, Hull, & St. Andrie, 2012). SEAs are currently the main agents to which the public turns to ensure quality control. Not all SEAs are staffed to perform these roles, however, and many lack the policy jurisdiction to enact effective controls.

This article first provides the context for the exploration of three SEAs and how they are dealing with these challenges, focusing on an overview of the three different virtual K–12 landscapes and

a discussion of forces shaping their futures. The article next focuses on the need for a growing role for SEAs in monitoring quality control of K–12 virtual education. This background helps frame the three case studies of Alabama, Florida, and Idaho, the political context in which these initiatives have evolved over time, what role their respective SEAs have played in overseeing virtual K–12 initiatives, and the challenges that lie ahead for both the future of virtual schooling in these states and for the state agencies that oversee these initiatives and their outcomes. The article concludes with a summary of findings from the research.

METHODOLOGY OF STUDY

This research follows an explanatory multicase study methodology. Case study methodology is particularly suitable for investigating issues of complexity, such as state-based education reform initiatives. Yin (1994) described the case study as an empirical inquiry that investigates a contemporary phenomenon in its real-life context—in this instance, virtual K–12 learning initiatives. To ensure a diverse collection of data, the study features multiple sources of evidence. These sources include *written documentation*, such as state-level documents, legislation, policy reports, program evaluation reports, and journal/newspaper articles regarding virtual learning initiatives in these three states. In addition, the study includes *open-ended interviews*, which were conducted by telephone and in correspondence with state agency personnel. Questions were posed regarding the history of their states' virtual K–12 programs; the key players in advocating for these reforms as well as resisting these reforms; and the role of the state agency in policy development, coordination, and oversight. Additional interviews were conducted with key education stakeholders outside of the state agency, representatives of Florida Virtual School (which is the largest and most prominent provider of virtual K–12 learning in Florida), current and former representatives of the Southern Regional Education Board (which had a significant role in promoting state virtual schools in states such as Alabama and Florida), and staff at Evergreen Consulting Group (producers of comprehensive research into the evolution of virtual K–12 education since 2004). It should be noted that some of the background information for this study originated from earlier research examining virtual K–12 teaching and learning (Natale, 2011). One of the goals of this earlier research was to identify which states have significant virtual K–12 learning initiatives and what specific requirements states have put into place to ensure the quality of their online teaching force—a key responsibility of state education agencies.

AN OVERVIEW OF VIRTUAL K–12 LEARNING

There are no firm estimates of the numbers of students enrolled part-time or full-time in online K–12 learning situations, and none of the virtual teaching force. Data collection is difficult because of significant growth in the number of public, private, and for-profit providers of online services, many of which operate outside the traditional school district structure. Homeschooled students frequently use online service providers for a portion of their course work, with no requirements to report to an educational agency (Picciano & Seaman, 2009). Even data on single-district programs offering online education are limited. As a consequence, data are often collected in the form of surveys, which feature only a sample of districts and rely on extrapolated results. A

As of the end of 2011:

Forty-eight of 50 states, plus Washington, DC, provided supplemental or full-time online learning opportunities to at least some students.
 Forty states had state virtual schools or state-led online initiatives.
 Thirty states, plus Washington, DC, had full-time online schools serving students statewide.
 Twenty states provided supplemental and full-time online learning options statewide.
 State virtual school enrollment grew 19% between 2009–10 and 2010–11, to 536,272 course enrollments.
 The percentage of students in full-time online schools varied from 3.89% in Arizona to .05 percent in Massachusetts (the average was 1%), with an estimated 250,000 total students enrolled.
 The overall estimate of K–12 students enrolled full-time or part-time was 4% or 2.0 million students.

Sources: The International Association for K–12 Online Learning (2012); Queen and Lewis (2011); Watson et al. (2011).

FIGURE 1 The scope of online learning for K–12 students.

recent example was a survey conducted in the late fall and winter of 2010–11 by the National Center for Education Statistics using its Fast Response Survey System. The survey included a sample of 2,310 public school districts in 20 states. The response rate was 94%, and the data were then weighted to yield national estimates that would represent all public school districts in the United States. A key finding of this survey is that from 2009 to 2010 there were an estimated 1,816,400 enrollments in distance education courses. Of those enrollments, 74% were in high schools, 9% in middle or junior high schools, and 4% in elementary schools. Fifty-five percent of districts had at least one student taking a distance education course (Queen & Lewis, 2011). Figure 1 summarizes some of the most frequently cited figures for the scope of online learning for K–12 students.

Case studies and anecdotes highlighting the most successful online programs may suggest that online K–12 learning is more prevalent than it really is. Even if 2 million students are taking online courses or engaged in blended learning as of the end of 2011, that still represents little more than 4% of the nearly 50 million K–12 public school students.

Online learning occurs in a vast array of contexts. Online instruction may be supplemental or full-time, within or across multiple school districts or states, or even internationally delivered. Instruction may range from fully online to fully face to face, delivered synchronously or asynchronously. It should be noted that most online learning currently occurs asynchronously—that is, students and teachers work at different times and have limited real-time interaction with one another.

The five main categories of online programs are described next¹:

1. *State virtual schools*: These state-led initiatives currently exist in 40 states. They are generally run by state agencies and funded through legislative appropriation, which is sometimes supplemented by fees. An exception is Florida Virtual School, which is

¹Most of the information in this next section is from the report *Keeping Pace with K–12 Online Learning* (Watson, Murin, Vashaw, Gemis, & Rapp, 2010, 2011)

subject to the public education funding formula. To date, Alabama and Idaho's state virtual schools are well funded via state appropriations relative to the size of the state, so that districts pay little or nothing for students to take an online course. Most provide supplemental courses to middle and high school students who are otherwise enrolled in another school part-time. State virtual schools are divided into two tiers: those with significant and stable or growing enrollment and those that are new, small or with declining enrollment. States that are substantially funded include the three states highlighted in this study (Florida, Idaho, and Alabama) as well as North Carolina, Michigan, and Montana. Many other state programs are in decline due to funding cuts.

2. *Multidistrict online schools*: These are frequently organized as charter schools covering grade levels K–12. Many are affiliated with educational management organizations (EMOs), such as Connections Academy and K12 Inc. (which now includes schools previously managed by Insight Schools, Kaplan, iQ Academy, and KC Distance Learning). Both of these EMOs—Connections Academy and K12 Inc.—operate schools in Florida and Idaho. These are mostly full-time programs, and most schools are subject to the same accountability as public or charter schools within the state. Students in EMOs constitute perhaps 75% of total enrollment in full-time online schools, although not all EMOs make their enrollment figures available. Full-time, multidistrict online schools continue to grow, with a gain of more than 50,000 full-time students between 2010 and 2011, bringing estimated totals of students enrolled in full-time online schools to 250,000 (Watson et al., 2011).
3. *Single-district programs*: These programs are run by a district and generally serve students within the district, although some districts allow students from other districts to enroll. Online courses may be provided by private vendors, full-time online schools, state virtual schools, or the districts themselves. Courses are generally supplemental and often combine online and face-to-face components in blended courses or programs. Data on enrollment are very limited, but anecdotal evidence suggests that district-level programs are the fastest growing segment of online and blended learning.
4. *Consortium programs*: These are essentially hybrid programs that may be run by a group of school districts, a nonprofit, or another intermediate education agency. Examples include the Virtual High School Global Consortium (which operates internationally), the Wisconsin eSchool Network, the Alaska Virtual Learning Network, and the Texas Virtual School Network.
5. *Postsecondary programs*: These programs are usually run by a university or college and provide mostly high school or credit-recovery courses. Some are full-time, whereas others are supplemental or both. Course fees are the primary source of funding. Examples of these programs are the University of Nebraska Independent Study High School and Brigham Young University–Independent Study.

FORCES SHAPING THE FUTURE OF K–12 ONLINE LEARNING

Future growth in virtual learning is expected to be fueled by a number of factors: (a) the rise of “blended learning,” (b) political advocacy by organizations such as Digital Learning Now!, (c)

expansion of large commercial interests in virtual K–12 schooling, and (d) shrinking state and local education budgets.

“Blended” instruction combines “distance” learning—online instruction that is outside of a traditional school environment and removed from an in-person teacher—with students learning online in an adult-supervised school environment. As a consequence, blended learning is often seen as the best of both possible worlds. Concerns over quality of course work, student readiness, and teacher quality can be allayed when “there is also a ‘flesh and bones’ teacher available to assist and guide students in their studies” (Picciano & Seaman, 2009). Horn and Staker (2011) pointed out that a small but growing number of schools are starting to introduce blended learning into their core programming for mainstream students.

Horn and Staker (2011) defined blended learning as “any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path and/or pace” (p. 3). Because “blended learning” can mean many different things to different organizations and people, Horn and Staker created a taxonomy of blended learning models that range from the “Face-to-Face Driver”—where teachers deliver most of the curricula and online learning is used to supplement and remediate—to the “Online Driver” where teachers deliver curricula in an online platform with students working remotely for the most part. Staker (2011) released a report in May 2011 that provided case studies of 48 different blended learning programs. Proponents point out the potential of blended learning, including providing individualized instruction, expanding the regular school day and year, and promoting competency-based learning. Each of these potential benefits allows for student funding and advancement to be decoupled from seat time. Alabama is one of several states that have introduced “proficiency-based credit” (Picciano & Seaman, 2009), and Florida Virtual School’s funding formula only provides payment for students successfully completing the course and passing end-of-course assessments (where applicable).

Staker’s (2011) report on blended learning models makes reference to the policy guidelines promoted by the Digital Learning Council, founded by former Florida governor Jeb Bush and former West Virginia governor Bob Wise. The report, *Digital Learning Now!*, which was released on December 1, 2010, provides a policy framework for states to use digital learning to transform the American education system. Recommendations include lifting caps on class-size ratios and enrollment, not restricting budgets for online and blended learning environments, not limiting the number of credits students can earn online or provider options for delivering instruction, and adopting competency-based standards for matriculation instead of seat time. These recommendations are designed to ensure that students have equal access to all providers—public, chartered, and private (Foundation for Excellence in Education, 2010). This last recommendation has generated some controversy. In a recent *Education Week* article, Gene V. Glass of the National Education Policy Center at the University of Colorado at Boulder was quoted as saying,

If the policy recommendations in [the report] were taken seriously, . . . half a dozen large private companies like K12 Inc. would have a clear path toward hundreds of millions of dollars of public education funding. . . . The ‘blend’ we see lobbied here is a blend of public monies and private profit-seeking. (Ash, 2011)

Regardless of blended or online models, it is clear that large commercial interests (both nonprofit and profit-making) have identified a huge potential market in virtual schooling, of which one component is schools run by EMOs. All online programs have content, software, or hardware

that has been provided by private suppliers. Many companies and organizations offer diverse services related to online learning. These include learning delivery and management systems, student information systems, Web conferencing, and other technology tools. These companies frequently serve as content providers, including sometimes providing instructional services. Many also provide professional development to educators. Virtual learning is also becoming more synonymous with mobile learning, here defined as “the act of accessing curriculum and instruction via devices that travel with students to a variety of locations beyond the school building” (Watson et al., 2010, p. 47). As a consequence, another industry is emerging in the development of tools such as netbook computers and iPads. Discrete “learning objects,” such as tutorials, practice activities, and skill-builders, also represent areas of possible growth, as does the production of podcasts, educator apps, and other mobile tools developed by companies such as Apex Learning and Blackboard.

Growth in virtual learning is also being fueled by shrinking state and local budgets. In many states, funding of state virtual schools is on the decline, and online learning activity is shifting from state virtual schools to the local level (Watson et al., 2011; Wicks, 2010). This trend has been accelerated by states responding to the Race to the Top federal grant competition by passing new charter school laws or lifting caps on existing charters, as well as introducing virtual charter school legislation. It should be noted that a few states, such as Alabama, Kentucky, Virginia, and West Virginia, currently do not have charter school laws, and there is minimal district-level online activity. However, there is growing pressure at the state level to expand online learning opportunities and digital textbooks as a way to save money. For example, a state budget task force in Georgia claimed that the state could save more than \$4.5 million if 1% of its students enrolled in two online courses (Alliance for Excellent Education, 2011). States such as Idaho, Florida, Michigan, Alabama, and North Dakota have adopted policies that require students to take at least one online course in order to graduate (Watson et al., 2010, 2011). Virginia governor Bob McDonnell signed into law a bill that will require Virginia high school students to take at least one virtual course to graduate with a standard or advanced diploma. The new requirement will apply to students who enter ninth grade in 2013–14. Expanding virtual education has been a key initiative for Governor McDonnell since he took office in 2010, and Virginia joins Idaho and Florida among states that have adopted online course graduation requirements in recent years.

There are also forces that may inhibit significant growth in enrollment in online courses and schools. For example, virtual learning may not be suited for some students’ needs and learning styles. In addition, not all schools have the technological infrastructure or ability to offer online classes. This problem is particularly acute in some rural areas that still do not have access to broadband Internet access in either schools or students’ homes—a challenge cited by states such as Maryland, West Virginia, and Kentucky in the 2010 Southern Regional Education Board (SREB) State Virtual School Survey. A lack of information technology staff has also been cited as a challenge in states like Louisiana and Florida. A survey of school administrators by Project Tomorrow (2011) asked about limitations to districts offering online courses. Thirty percent cited limited state funding, 26% cited the ability to evaluate the quality of online courses or curriculum, 18% said the lack of expertise to create their own online courses, 14% said teachers were not comfortable teaching online courses, and 12% said teachers were reluctant to teach online classes.

Although many programs and schools claim significant savings from virtual schools, there remain concerns about the quality of online learning and whether real accountability exists. Strong accountability systems are crucial to identify ineffective practices and programs. Dillon

and Tucker (2011) observed that “without rigorous oversight, a thousand flowers blooming will also yield a lot of weeds.” Research in K–12 virtual education has been very limited. A meta-analysis and review of online learning studies by the U.S. Department of Education concluded that students in online learning conditions performed modestly better than those receiving face-to-face instruction; however, students in blended learning conditions often are provided with additional learning time and instructional elements not received by students in face-to-face situations. The study further points out that there are only a small number of rigorous published studies of K–12 students, so caution is needed in generalizing the results of this meta-analysis (USDE, 2010).

In summary, the world of virtual K–12 learning is undergoing rapid growth and change. Advocates believe that virtual learning has the power to transform an obsolete K–12 system of schooling by providing the means to personalize learning, ensure all students have access to quality teaching, and extend learning to all hours of the day and days of the week—and do so in a cost-effective manner. Critics contend that adequate safeguards on quality are lacking and that there needs to be incentives for virtual programs to provide high-quality outcomes first, and secondarily to do so at a lower cost (Staker, 2011). Critical to ensuring quality instruction is ensuring the availability of high-quality teachers skilled in online pedagogy. Monitoring of student outcomes and teacher quality are key responsibilities of states, so SEAs need to become more actively involved in quality control of virtual learning.

THE ROLE OF SEAS IN VIRTUAL K–12 LEARNING

Murphy and Hill (2011) stated that “SEAs of the future will be asked (by the federal government as well as their own elected officials) to shift from their historically passive role of compliance to playing a much more active role in managing the performance of schools” (p. 1). This is particularly true in the context of K–12 virtual schooling. Growth in charter schools and virtual K–12 education alternatives is being accompanied by increasing demands for more accountability and quality-control systems. There are several options for these systems: (a) input and process regulation (a compliance-based approach that rewards obedience rather than excellence), (b) outcome-based accountability (which is very difficult to implement, as the vast majority of online courses do not have reliable assessments), and (c) outcome-based quality control (which depends greatly upon the degree to which parents and educators are discerning and demanding consumers of digital learning). This is particularly relevant as K–12 education is publicly run, funded, and regulated and is thus inherently public. Digital learning destandardizes and decentralizes educational delivery, so it presents challenges in applying quality control systems and metrics that were developed for more traditional school structures. In addition, many providers are profit-seeking ventures, which further complicates the picture and adds to its political volatility (Hess, 2011).

Although it is possible to delegate performance monitoring to third-party monitors, it is also equally valid to assign this responsibility to states. Chubb (2012) looked toward states as the best solution to setting K–12 online learning policies, instead of leaving policy making in the hands of local districts. However, Chubb’s recommendations are targeted at promoting a free market and less restrictive state model related to virtual learning (Barbour, 2012). Glass and Welner (2011) stated that “virtual education presents policy challenges to education at all levels, from local boards to the federal government. However, the challenges are particularly acute for states,

because states bear responsibility for sanctioning and chartering online providers” (p. 1). Quillen (2012) noted that virtual public schools run by independent for-profit and nonprofit organizations are growing faster than states can hope to regulate them. Hess (2011) argued for the need for families to acquire a vested interest in virtual learning. He noted,

This step is essential if parents are to approach schooling as more than a unitary service and to start thinking about the quality of particular services, and if education officials are to enjoy the encouragement and support they need in order for them to revisit and change deep-seated routines. (p. 8)

Last, states play critical roles in ensuring that there are qualified teaching forces in virtual K–12 environments, and this is a challenge that only a few states have begun to tackle head-on. Whether through SEAs or through professional standards boards, states bear the responsibility of licensing teachers and approving teacher education programs. The summary report of the Invitational Summit on Redefining Teacher Education for Digital-Age Learners (Resta & Carroll, 2010) reinforces the idea that state educator certification policies must support new roles for educators and new ways of staffing schools—that is, teachers who facilitate learning rather than simply delivering educational content. Bodies that approve teacher preparation programs need to hold higher education institutions accountable to prepare their graduates to work in the digital age by requiring evidence that teachers have the knowledge and skills to teach in both online and blended learning environments.

Further, common national competency standards need to be established for digital-age teachers as a means to help ensure state-to-state reciprocity (Resta & Carroll, 2010). The Digital Learning Council in its *Digital Learning Now!* report makes a series of recommendations for online teachers, including that states should provide alternative teacher certification routes, including online instruction and performance-based certification, and allow for certification reciprocity or permit online teachers to earn certification in other states (Foundation for Excellence in Education, 2010).

The State Educational Technology Directors’ Association (SETDA) has also recommended that states recognize teacher licenses and certifications from other states. The organization has noted that some members of the educational community are discussing the possibility of a national certification for virtual teachers (SETDA, 2008). A teaching endorsement can serve as an indicator of completion of initial training in theoretical, technical, and pedagogical foundations, as well as in the legal and ethical issues related to online courses. The endorsement potentially indicates that a teacher has skills in curriculum and basic media design for online learning as well as understanding of technical issues such as online management systems and use of asynchronous or synchronous features.

It is currently common practice that states require virtual educators to be state-certified and “highly qualified,” with a handful of states permitting teachers to be certified in another state—Michigan, Nevada, North Carolina, Montana, and West Virginia (Center for Digital Education, 2009; Watson et al., 2010). Some states, such as Alabama, allow university faculty to serve as online teachers. At least 22 states require virtual teachers to complete appropriate training to teach online, whereas five states do not require any specific training (Bush, 2009). Currently, six states have adopted online teaching endorsements: Georgia, Idaho, Louisiana, Michigan, South Carolina, and Utah. All are currently voluntary. Several states, such as Colorado and Arizona, are considering adopting online teaching endorsements. Several states have expressed interest in

a content-area test for online educators. Currently, South Carolina and Idaho have provisions in their certification regulations requiring the demonstration of competency in online teaching, with one option being a content area examination (Natale, 2011).

It is important to note that states' oversight of virtual schooling must go beyond teacher certification. Glass and Welner (2011) noted that additional oversight and scrutiny by states is needed if public trust in public virtual education is to be maintained. It is sometimes uncertain who is actually doing the teaching in a virtual school. K12 Inc. once outsourced the instructional functions of the Arizona Virtual Academy to workers in India (a practice subsequently terminated). Further, there are questions about the authenticity of student work, and few states require onsite proctoring for tests. In addition, there are a number of private groups, such as the Middle States Association of Colleges and Schools and the New England Association of Colleges and Schools, which offer accreditation services to virtual schools. However, in some cases, the legitimacy of these accreditation bodies is unclear as the U.S. Department of Education or other accreditation bodies have not approved the accreditation processes used by these groups.

In summary, SEAs are the most likely agents for ensuring the quality of virtual schooling. The following sections will elaborate on virtual K–12 initiatives in three states—Alabama, Florida, and Idaho—and on how they are meeting the challenges of access, quality control, and cost.

CASE STUDY 1: ALABAMA

Alabama's virtual K–12 learning system is noteworthy for several reasons. First, almost all virtual education activity takes place through the state virtual school—Alabama Connecting Classrooms, Educators and Students Statewide (ACCESS). There are currently no charter school laws, so Alabama has not been subject to the explosive growth in private providers of full-time virtual schools, as in other states. Because ACCESS has provided quality online supplemental courses at reasonable prices, there are few, if any, district-based programs (Watson et al., 2011). Second, the Alabama SEA has played a major role in the development and implementation of ACCESS with policy leadership from the governor's office, the office of the state superintendent of schools and the office of technology involved.

History of ACCESS

ACCESS is an outgrowth of Governor Bob Riley's vision that technology could level the playing field for Alabama's students, regardless of wealth and geography. In the fall of 2004, Riley, a former U.S. Representative and businessman who served as governor from 2003 to 2011, charged the state superintendent of schools, Dr. Joe Morton, with coming up with a plan for distance learning in a mere 6 weeks so he could present it to the legislature for funding in the next session. Dr. Melinda Maddox, Director for Technology Initiatives for the Alabama SEA, with input from both the governor and state superintendent, drafted the membership for the Task Force on Distance and Blended Learning. Its membership strategically included SEA staff, superintendents from local school districts, local district technology coordinators, higher education representatives, teacher union representatives, and other major stakeholders. Their report was issued on November

1, 2004, and, by the spring of 2006, courses were up and running.² The initiative was supported with a \$20 million appropriation over the first 2 years.

Initially, ACCESS used Florida Virtual School and Aventa Learning as content providers, but over time ACCESS developed their own courses, sometimes using open educational resources. Remediation models were also developed to prepare students for the Alabama High School Graduation Exam. By the end of the 2010–11 school year, ACCESS offered 115 courses. As of 2010–11, ACCESS employed 659 teachers (all adjunct). Because courses are mostly asynchronous, online teachers can teach traditional classes during the day and then manage online courses from their homes at night (Staker & Trotter, 2011; Task Force on Distance and Blended Learning, 2011). As of the 2010–2011 school year, ACCESS provided 33,743 course enrollments, making it the third largest state virtual school after Florida Virtual School and North Carolina Virtual Public School (Watson et al., 2011).

Local district support developed as ACCESS filled a critical need to staff secondary core subject area positions. Many districts were losing experienced teachers to states like Tennessee and Georgia, where veteran teacher pay was much higher. Once principals and superintendents became comfortable with the online delivery model, they began to take advantage of other offerings that expanded the curriculum, such as foreign language.³ Although the ACCESS state appropriation for 2011–12 is \$18,506,242, representing a decrease of \$597,537 from 2010–11, the state has been able to continue expansion of course offerings in a cost-efficient manner for districts by adjusting its internal budget (Watson et al., 2011).

It is also noteworthy that, in 2008, Alabama became the first state to establish an online learning graduation requirement, beginning with the graduating class of 2012–13 (Watson et al., 2010).

The Role of the Alabama SEA

ACCESS differs significantly from other state virtual school models because of its focus on the development of a technology infrastructure for receiving online and video courses at school sites throughout the state. This means that a significant portion of funding has gone toward technology infrastructure—including bandwidth, tablet computers, and interactive videoconferencing equipment. This technology infrastructure has resulted in affordable and equitable access to technology for all districts, which allows all ACCESS courses to be offered in a blended format (Watson et al., 2010). Aggressive advocacy for blended learning is attributed to Dr. Melinda Maddox, who advocated for a combination of a blended learning model and a learning management system, which may help prepare students for college and careers (Staker & Trotter, 2011).

The Alabama SEA has established critical partnerships with the three regional ACCESS support centers (Troy University, the University of Alabama, and Madison City Schools). The support centers have been critical in providing continuous assistance, communication, and training to district personnel and students in the learning management system, the registration portal, and procedures (Task Force on Distance and Blended Learning, 2011). A representative of the

²Retrieved from <http://accessdl.state.al.us/accessplan.pdf>.

³Interviews with Alabama SEA personnel (personal communications, January 25, 2012; February 23, 2012).

Alabama SEA commented that, by partnering with the three service centers that handle the day-to-day implementation of ACCESS, the SEA is able to focus on critical policy issues.

The Alabama SEA is credited for being not just knowledgeable but forward thinking. It has served as the “network” for putting together a comprehensive statewide initiative by involving all school districts and network providers as well as securing legislative support through the governor’s office and other policy advocates. According to an administrator in the Talledega School District, there have been strong relationships between the Office of Technology Initiatives and the state superintendent, between the state superintendent and the governor’s office, and between the SEA and the state’s higher education institutions.

Another area of state agency leadership has been critical in developing a strong virtual teaching force. Like many states, Alabama requires its virtual teachers to be both “highly qualified” and Alabama certified. What makes Alabama unique is that it controls the selection, training, support, and ongoing professional development for all ACCESS teachers. All ACCESS teachers are adjunct, with courses mostly taught outside the normal school day. Teachers are required to have at least 3 years of “face-to-face” teaching experience. Teachers are also required to participate in 3 days of initial training covering such topics as policies, online pedagogy, and course technology. New teachers are assigned a mentor and are required to participate in monthly webinars. Experienced virtual teachers participate in periodic online professional development, with one face-to-face training session each year. Teachers are paid generous stipends, and there are waiting lists for teachers in most subjects, except among some world languages.

Challenges for the Future

To ensure ongoing funding and political support for ACCESS, the SEA has continued to convene the Task Force on Distance and Blended Learning. In its most recent report, *A Plan for Continued Excellence 2011–2016*,⁴ the Task Force lists nine objectives over the next 5 years, including expanding the availability and use of ACCESS distance and blended learning, refining and expanding blended models of instruction to every high school, using ACCESS resources to support and evaluate teachers and facilitators, and providing a continuum of student academic and career mentoring for students. Other priorities relate to expanding stakeholder awareness and appreciation of the ACCESS program; establishing collaborative relationships with 2- and 4-year institutions, industry, and other community entities; and developing sustainability and long-term funding for maintenance and growth in the numbers of students served. In addition, one objective for the Alabama SEA and Support Centers is to continue to provide administrative oversight, management, and support for ACCESS.

The Plan cites a number of ACCESS’s critical accomplishments to date:

- AP test takers have doubled from 2004–2010, with the number of AP test takers who are African American more than quadrupling.
- Five times as many low-income students took AP exams, and 3 times as many scored a three or higher.

⁴Retrieved from <http://accessdl.state.al.us/Documents/NewPlan/ACCESSPlanFinalJan2011.pdf>

- Between 2002 and 2008, Alabama's high school graduation rate has climbed from 62.1 to 69 percent, with ACCESS being the driving force in bringing advanced course work and alternative education options to Alabama.
- All Alabama high schools now have 21st-century distance and blended learning labs that include tablet computers, videoconferencing equipment, interactive whiteboards, and other technologies.
- Broadband connectivity (a minimum of 20 Mbps and recently upgraded to 50 Mbps based on demand) has been funded by the program and installed in every public school system (Task Force on Distance and Blended Learning, 2011).

A 2010 evaluation report of ACCESS conducted by the International Society for Technology in Education also examined educational outcomes. Common themes that emerged from interviews and focus groups with stakeholders were that the benefits of ACCESS included increased graduation rates, broadened horizons for higher education, preparation for college and the world of work, enhanced student attitudes toward learning, and providing a "window on the world." A key finding of a statewide survey was that equity and choice were key benefits of ACCESS (Bielefeldt, Roblyer, & Olszewski, 2010).

Evidence of positive educational outcomes and public support will be critical to maintaining the future for ACCESS and a strong role for the Alabama SEA, as the political landscape has changed. As of 2012, there is a new governor (Robert Bentley) and state superintendent (Dr. Tommy Bice). The new governor publicly announced his support for ACCESS in his 2012 State of the State address.⁵ Despite this support, the Alabama legislature has cut education budgets in the past couple of years but has also looked toward a greater use of technological resources to offset the loss of teachers. The largest challenge will be ensuring adequate funding for virtual learning to ensure that districts will have access to resources in a highly equitable and cost-effective manner. One Alabama SEA official stated that there is no way that the state could replace what ACCESS offers at a competitive price. Alternatives to ACCESS could potentially cost districts more money; be subject to less quality control; and disadvantage smaller, less-resourced districts that cannot run their own online programs. This view was confirmed by one local district administrator who stated that, under ACCESS, no students are turned away. "Most kids want their community school and face-to-face teachers."

CASE STUDY 2: FLORIDA

Florida's efforts to innovate and expand online learning opportunities for its students have been groundbreaking. Florida Virtual School (FLVS) is the country's largest and oldest public online course provider. More students in Florida take online courses than in any other state.⁶ In addition to FLVS, Florida offers statewide, full-time online schools and district programs (Watson et al., 2011). In 2011, legislation was introduced that further expands virtual options for Florida's K-12

⁵Alabama State of State Address. 2012. *State line*. Retrieved from stateline.org/live/details/speech?contentId=630768

⁶To place this statement in context, only 2% of Florida's students participated in online learning opportunities during 2010-11, according to a Florida SEA staff member.

students, once again making Florida unique in the nation, even as other states open up more virtual options for their students.

History of Florida's Online Learning Programs

Florida school officials and state legislators supported the development of online learning as a way to serve students in rural areas where the schools did not offer many courses that were available in larger, more populated areas. Online learning was also seen as a way to relieve the state's overcrowded public schools (Donovan, 2011).

Florida's online initiatives began in 1995–96 when two online educational programs were launched in Alachua and Orange County Public Schools to provide computer science courses to more students. In 1996, the State of Florida awarded a “break-the-mold” grant totaling \$200,000 to Orange and Alachua county school districts to collaborate in developing an online high school. In 1997, the Florida High School was launched for the purpose of creating a complete diploma-granting high school online that would be supported with specific legislative appropriations. (Florida Tax Watch, 2007). Florida High School would soon evolve into FLVS.⁷ Partners in the early days of this online initiative included the SREB, which coordinated a network of state virtual school leaders, and IBM, which became a critical partner in determining how to scale programs, courses, and course management systems. For the first 6 years, funding for the program was through a line-item state appropriation, and courses were added as funding increased. In 2000, FLVS was established by statute as an independent education entity with a gubernatorial-appointed governing board (Watson, Winograd, & Kalmon, 2004).

In 2002 and 2003, legislation was introduced to (a) make FLVS an independent statewide public school; (b) grant parental rights for public school choice with FLVS as an option; and (c) roll FLVS into the state's funding formula, treating FLVS as a special school district (like the Florida School for the Deaf and Blind and several lab schools connected to universities). Most important, this funding structure allowed FLVS to grow based on enrollment, as funding followed the student. In addition, funding was based on “course completion and performance” rather than traditional seat time. Another unique aspect of FLVS funding was that legislation directed the board of trustees “to aggressively seek avenues to generate revenue to support its future endeavors, and shall enter into agreements with other distance learning providers”.⁸ The board of trustees was given full right to retain revenues from such activities, and to use those funds to support the school's research and development activities. There was initially resistance from some school districts to enroll students in FLVS when the funding formulas changed to have funding follow the student. Nonetheless, participation by students in FLVS courses steadily increased and some districts opted to open franchises with FLVS beginning in 2001.

High-level political support was critical to the expansion of FLVS, as well as other virtual choice options. Governor Jeb Bush, who served as governor from 1999 to 2007, was a firm believer in school choice and took on FLVS as one of his projects. Daniel Webster (now a U.S. congressman) was also a champion for the expansion of FLVS. It should be noted that, in 2010,

⁷When not otherwise noted, information regarding the history of FLVS was provided by FLVS personnel.

⁸Section 1002.37 (2)(c) of the Florida statutes (http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=1000-1099/1002/Sections/1002.37.html).

Bush cofounded Digital Learning Now! with former governor Bob Wise of West Virginia. The two formed the group to advance policies promoting quality digital learning environments and future technological innovations in public education. The organization's state report card gives high marks to Florida for providing almost all students access to virtual learning opportunities and using student learning as a metric in evaluation, including compensation of online teachers and funding.⁹

Today, FLVS serves students in all 67 Florida districts, as well as in 50 other states and 57 countries. It offers more than 110 courses and, during the 2010–11 school year, served 122,000 full-credit and 259,928 half-credit enrollments. FLVS operates the “Florida Virtual School Classic” (Grades 6–12) traditional supplemental model, the Florida Virtual School Franchise (district partnerships), and the Florida Virtual School Full Time Public (in partnership with Florida Connections Academy, the only full-time statewide K–12 program in Florida).¹⁰ FLVS currently operates 280 virtual learning labs in Florida districts.¹¹

Legislation in 2002 also required a decrease in class size across the state by 2010, which further fueled districts' interest in pursuing virtual learning. In 2003, the Florida legislature funded a K–8 Virtual Pilot program to study the effect of virtual programs on public school class size. As of 2004, there were two K–8 pilot programs—Florida Virtual Academy (operated by K12 Inc.) and Florida Connections Academy (operated by Connections Academy, Inc.; Watson et al., 2004). These two options continue today, with Connections Academy operating as the new FLVS Full Time statewide school (Watson et al., 2011). FLVS also partners with Connections Academy to utilize FLVS content for their out-of-state courses.¹²

Beginning in 2009–10, all 67 Florida districts were *allowed to offer* a full-time virtual education option for their students through the district Virtual Instructional Programs (VIP). This could include contracting with FLVS, establishing a franchise with FLVS, contracting with online learning providers approved by the Florida SEA, entering into an agreement with another school district or multiple districts, or operating their own programs.

According to one political insider interviewed for this article, the reason a new legislative package was introduced in 2011 was to promote the expansion of virtual charter schools. This legislation¹³ substantially increased district options and requirements to include the following:

- FLVS must now offer a full-time option directly to all K–12 students statewide.
- Supplemental middle school courses beyond those currently offered for accelerated fourth and fifth graders can now be offered through FLVS or its district franchises.
- School districts must offer individual online courses for students in grades pre-kindergarten to 12 (in addition to what they offer in their brick-and-mortar schools), district VIP and district franchises of FLVS.
- Medium and large districts *must offer* at least three different options at all grade levels as part of each district's VIP program; smaller districts must offer at least one option.
- Full-time online charter schools are now authorized, subject to approval by the Florida SEA.

⁹Retrieved from <http://digitallearningnow.com/wp-content/uploads/2011/10/Florida.pdf>

¹⁰FLVS fact sheet: www.flvs.net/areas/aboutus/Pages/QuickFactsaboutFLVS.aspx

¹¹Discussion with FLVS staff.

¹²FLVS fact sheet: <http://www.flvs.net/areas/aboutus/Pages/QuickFactsaboutFLVS.aspx>

¹³CS/CS/HB7197 (2011); see Watson et al. (2011) for a comprehensive breakdown of the law.

- District schools are authorized to offer both online and blended courses, and full-time online charter schools are authorized to offer blended courses.

Concurrent with these new requirements, funding was significantly reduced for both brick-and-mortar schools and virtual schools. District-wide average funding per full-time student now averages \$6,999.38, which represents a reduction when compared to the previous year's total of \$7,700.90. FLVS FT funding was also reduced from \$5,192.85 in 2010–11 to \$4840.52 in 2011–12 (Florida Virtual School, 2011, 2012).

The 2012 legislative session continues to present new challenges to districts as the proposed Senate Bill CS/CS/SB 1402¹⁴ further expands digital learning options for students in public schools, including allowing pre-kindergarten through Grade 5 students to participate in FLVS full-time district virtual instruction programs and full-time virtual charter schools. The proposed bill also authorizes FLVS to expand part-time instruction to kindergarten through Grade 3, as well as to students in Grades 4 and 5. Previously, Grade 4 and 5 students were only able to take courses provided to Grade 6 to 8 students. FLVS must also provide services to exceptional students and English for Speakers of Other Languages.

The Role of the Florida SEA

FLVS had an early dominant role in Florida's online learning options that included significant political support from the governor's office. This support permitted the Florida SEA to take a less active role in oversight than what might otherwise have been required. Although the commissioner of education was charged with monitoring the performance of FLVS, oversight of other district-based virtual offerings was limited. The Florida SEA looked to FLVS as the model for Florida online programming, and the majority of Florida legislation in the period of 2000–04 that dealt with online education pertained mostly to FLVS. There were other online programs and course offerings at the district level, but at that time the Florida SEA did not track them (Watson et al., 2004).

According to FLVS staff, FLVS and the Office of Virtual Education in the Florida SEA have had a close relationship over many years. It should be noted, however, that the Office of Virtual Education has only one full-time staff member. This person—who serves as the liaison between virtual providers, districts, and other SEA departments—has described SEA staff as being “very knowledgeable about virtual schooling and related specific issues.” The Florida SEA defines its role as follows:

- Approving private providers of virtual education.
- Providing information about public virtual education options to parents, students, citizens, researchers and others.
- Providing technical assistance to school districts, virtual schools, and providers related to reporting and funding requirements.
- Reporting information related to virtual programs, schools, and students.

¹⁴Retrieved from <http://www.flsenate.gov/Session/Bill/2012/1402/Analyses/FBxtXA90KjTRVhO4Q=PL=yDjme1EvE=111/Public/Bills/1400-1499/1402/Analysis/2012s1402.bea.PDF>

- Analyzing proposed legislation and policies related to virtual education. (Florida SEA, 2011)

Currently, Florida requires virtual educators to be Florida certified but requires no specific certification provisions for online teachers or virtual teacher training. Instead, the Florida SEA has relied on FLVS for quality control. FLVS have described the rigorous screening process they have for prospective online teachers (including screening for the ability to work with technology, writing ability, and student-centeredness) and how they provide ongoing and extensive professional development in online pedagogy, literacy skills, learning theory, technology, and customer service. Florida SEA staff also confirm that FLVS provides training and mentoring to virtual teachers in 40 of 67 Florida school districts who have FLVS franchises.

Challenges for the Future

Leadership had been anticipated from the recently appointed commissioner, Gerard Robinson, who was an advocate of both public charter schools and the expansion of public school virtual learning programs when serving as the former secretary of education for the Commonwealth of Virginia.¹⁵ On April 13, 2012, Commissioner Robinson announced the appointment of members to the Florida 2.0 Digital Learning Group, which is a new task force charged with developing a comprehensive plan to ensure that Florida has the infrastructure, instructors, and institutional reforms to ensure Florida remains a national leader in digital learning.¹⁶ As of August 31, 2012, however, Gerald Robinson resigned as commissioner, so leadership in the future is uncertain ("Florida Chief," 2012). The current governor is supportive of expanded use of charter schools; however, the SEA has been described as a very traditional system, and a former political appointee commented that it might be hard for a Commissioner to come in and not "ruffle feathers." One senior official with the Florida SEA commented that the role of the department in virtual learning oversight may be restricted because of fixed staffing levels and that it takes higher level leadership to increase staff.

The Florida SEA has been described as supportive of the expansion of digital learning options but also concerned about ensuring quality. The main disagreement in Florida is how fast virtual schooling should expand. As its role expands, FLVS will begin to take on the full responsibilities of a school district, which will require coordination with other SEA departments, such as curriculum and special needs. Other full-time programs will require similar support and oversight.

Florida's current funding model, however, may be an impediment to the growth of district online programs and virtual charters.¹⁷ Districts do not receive funding for virtual education programs unless students successfully complete the courses or pass the end-of-course assessments (if available), whereas brick-and-mortar schools receive funds regardless of a student's successful completion. This means that school districts and charter schools take on more financial risk by creating their own online programs or contracting with private providers as compared to a traditional brick-and-mortar school funding model.

¹⁵See Commissioner's profile: <http://www.fldoe.org/commissioner/cbio.asp>

¹⁶Retrieved from <http://www.fldoe.org/news/2012/2012.04.13.asp>

¹⁷FLVS fact sheet: www.flvs.net/areas/aboutus/Pages/QuickFactsaboutFLVS.aspx

Florida is potentially breaking new ground nationally in maximizing choice options, particularly in the area of virtual learning. The role of FLVS is evolving and, as one FLVS spokesperson noted, FLVS continues to provide a unique niche in the world of online options. Recent Florida legislation will likely open up new virtual learning opportunities and participation in an increasingly competitive environment. Accordingly, the role of the Florida SEA may also need to be strengthened in the areas of oversight, coordination, and policy advocacy.

CASE STUDY 3: IDAHO

Idaho has recently gained national attention because of the ambitious “Students Come First” education reform package proposed by Governor C. L. “Butch” Otter and State Superintendent Tom Luna. Enacted in 2011, this legislation introduced significant reforms in teacher evaluation, teacher contracts and tenure, pay-for-performance provisions, and significant expansion in virtual education options for students. These expansions included the requirement that students must complete a minimum of two online course requirements to graduate and that schools receive additional funding for mobile computing devices for all high school students.¹⁸

Idaho has the fifth largest state virtual school (Idaho Digital Learning Academy [IDLA]) in terms of course enrollments, with seven statewide full-time virtual charter schools and a state distance learning academy. Ninety-eight percent of Idaho school districts have at least one student taking an IDLA course (Watson et al., 2010).

History of Idaho’s Online Learning Programs¹⁹

Advocacy for virtual learning initiatives originated in 2002 through the legislature because of concerns about the needs of rural schools. Idaho is a large state with many rural and remote communities. Technology was viewed as a device to provide both equal access and opportunity to every student and to close the digital divide. Efforts began with the creation of the statewide IDLA, continued with the implementation of the Idaho Education Network, and have now culminated with the passage of Students Come First education reform laws.

In 1998, Idaho passed a law allowing public charter schools to open. The first virtual charter school (Idaho Virtual Academy) opened its doors in 2002. There are currently seven virtual public charter schools. During the 2010–11 school year these schools had a total enrollment of 5,223 students. Idaho Distance Education Academy is similar to a virtual charter, but is classified as a distance education academy (Watson et al., 2011).

At least three school districts²⁰ also offer online programs using commercial online provider content and technology support. This was the result of advocacy from several local district superintendents, who wanted options other than IDLA. In 2009, Superintendent of Instruction

¹⁸Retrieved from <http://www.studentscomefirst.org/legislation.htm>

¹⁹Unless otherwise cited, this information came from interviews with and information provided by the Idaho SEA, Idaho Association of School Administrators, and Idaho School Boards Association personnel.

²⁰Watson et al. (2011) lists the districts as Vallivue, Emmett, and Coeur d’Alene; SEA personnel cite the districts as Vallivue, Bonneville, and Minidoka.

Tom Luna worked with the legislature to allow them to use up to 5% of the funding they receive to hire and pay teachers to provide students with virtual coursework.²¹

IDLA was established by the Idaho legislature in 2002 as a state-sponsored, accredited, online virtual school. Unlike other state virtual schools, it was not housed at the Idaho State SEA but rather within the Idaho Association of School Administrators. The Albertson Foundation²² provided some of the initial funding. In the past 10 years, IDLA has become a significant presence in nearly all Idaho school districts, offering supplemental courses as well as various blended learning options. Even virtual charter schools offer IDLA courses because of their comprehensive course offerings.

Funding increases were relatively consistent until 2010, when Governor Otter proposed phasing out state funding for IDLA over 4 years. This resulted in a 22% reduction in funds for 2010–11. Whereas IDLA had experienced a 49% growth in 2009–10 from the previous year, enrollments grew only 1% in 2010–11 (Watson et al., 2011). Resistance to the governor's proposal resulted in modifications to the funding proposals for IDLA in 2011. IDLA is scheduled to receive \$6 million in fiscal year 2012 and \$5 million in fiscal year 2013, with future funding to be a base amount from a state appropriation and revenues it receives from fractional Average Daily Attendance funding.²³

The Idaho Education Network (IEN) originated in 2008 to establish a coordinated, statewide telecommunications distribution system for distance learning for each public school. Distance learning was to be provided through two-way interactive video, data, Internet access, and other telecommunications services. The IEN would also include connections to each institution of higher education and other locations as necessary to facilitate education, teacher training, and other related services. The IEN was supported by Governor C. L. "Butch" Otter, along with Superintendent Luna and key legislators. As noted in the 2011 NASCIO Recognition Award Submission by the Idaho Office of the Chief Information Officer (2011), "Governor C. L. Otter "Butch" Otter, believes in empowering Idahoans to be the architects of their own destiny and that education is the key to economic and social well-being and Idaho's future prosperity. Since the start of the project, the IEN has enabled the 'have-nots' to receive the same educational advantages as the 'haves.'" Initial funding was from the federal stimulus package, the Albertson Foundation, and federal e-Rate funding. The first phase of IEN was completed in the fall of 2011, as Idaho connected every public high school, college, and university to a high-speed, broadband Internet service. The state also created at least one classroom in each facility with video-teleconferencing capabilities to foster distance learning.

The latest phase of Idaho's virtual learning initiatives was promoted through Students Come First, a comprehensive education reform initiative passed by the Idaho legislature in 2011. Certain provisions of this reform bill expanded digital learning options by allowing students to enroll in online courses of their choice without prior permission from their local school or charter school and established a one-to-one ratio of students and staff to laptop devices in every high school. In

²¹House Bill 303, passed in 2009 (<http://legislature.idaho.gov/legislation/2009/H0303.htm>).

²²Retrieved from <http://www.jkaf.org>.

²³Retrieved from <http://www.SEA.idaho.gov/site/docs/comm/FAQs%20on%20Budget,%20March%207,%202012.FINAL.pdf>

addition, the state implemented the requirement for students in the class of 2016 to complete two of their 46 credits online or through digital learning.²⁴

Students Come First has faced some criticism, with some constituencies collecting enough signatures to place a referendum on the November 2012 ballot (Bonner, 2011). However, there has been strong support from the Idaho Business Coalition for Education Excellence, the J. A. and Kathryn Albertson Foundation, and the Boise Metro Chamber of Commerce. Representatives of the Idaho Association of School Administrators and Idaho School Boards Association noted that, in general, the smaller rural districts have been supportive of the technology proposals, whereas some of the larger school districts have been in opposition. Principals and superintendents have generally supported IDLA but have also expressed concern about reform proposals that make it self-funded and competitive with online vendors. The areas that sparked the greatest concern were the funding provisions that reduced salary-based apportionments to districts and reallocated them to the laptop initiative and pay-for-performance funding.

The Role of the Idaho SEA in Overseeing Virtual Learning

Since the election of Governor Butch Otter and State Superintendent Tom Luna in 2006, the Idaho SEA has exercised strong policy leadership, particularly in the area of expanding digital learning and school choice.

Prior to 2007, the SEA did not play a significant role in overseeing the state's virtual state school (IDLA). The SEA's involvement in overseeing digital learning grew in part as a result of a 2007 audit of online charter schools, including virtual schools. The audit indicated that oversight of virtual schools was inadequate and that all online charter schools should be authorized by the Public Charter School Commissions and accredited by the Northwest Association of Accredited Schools. The report also recommended additional reporting requirements. The SEA now conducts site visits of virtual schools along with accreditation teams as well as site visits by SEA teams in special areas, such as special education (Watson et al., 2010).

The J. A. and Kathryn Albertson Foundation has worked closely with the SEA to promote education reform initiatives and digital learning proposals. The foundation provided a \$21 million grant to the SEA to help equip all public schools in the state with learning management software (Philanthropy News Digest, 2011). Funds were also provided to Boise State University to support professional development for virtual teachers.

The Idaho SEA has also been a leader in addressing standards for online teachers. In 2011, the state passed legislation to create an online teaching endorsement. Requirements include an 8-week online teaching internship and completion of a state-approved program of at least 20 semester credit hours of study in online teaching and learning at an accredited college or university or a state-approved equivalent. There are also provisions for demonstrating competency in the Idaho Standards for Online Teaching that were approved in 2010. The online endorsement is currently voluntary, but there is interest in making it required for all online teachers in the future, as well as adopting a content-area examination for online teachers. This would enable Idaho to credential experienced online teachers without requiring them to take additional course work to qualify for

²⁴Proposed administrative rules relating to section 08.02.03 of the Idaho administrative code. Retrieved from http://www.boardofed.idaho.gov/meetings/special_events/documents/proposed_admin_rule.pdf

an endorsement, as well as provide a standardized way to issue a teaching certificate (Natale, 2011).

Challenges for the Future

The Idaho SEA faces many challenges in dealing with the rapid expansion of online learning in Idaho. The complexities of the Students Come First reform legislation have significantly strained the capacity of the SEA to deal with myriad policy decisions that relate to the technology provisions of the law. A representative of the Idaho Association of School Administrators notes some of these concerns. For example, what policies need to be created regarding students carrying mobile computing devices home? What professional development is needed to teach using these devices? What happens if funding is inadequate to provide all high school students with mobile devices when the graduation requirement of two online courses kicks in? One SEA official aptly commented that “the infrastructure is being built as the plane is being flown!”

SUMMARY OF RESEARCH FINDINGS

McDermott (2009) pointed out that it is difficult to make casual references or even to generalize about state-level differences through multiple-case qualitative studies. However, one can draw conclusions about how a particular kind of policy is working by examining a representative group of states. These three case studies illustrate the challenges that SEAs face in the rapidly evolving world of virtual K–12 learning. A particular challenge that these case studies have identified is the need for state agencies to exercise greater regulatory and policy oversight to safeguard the public trust.

Three factors appear to be critical in defining the role of SEAs: the political environment, the nature of SEA leadership in online learning initiatives, and SEA staffing and resources.

Watson et al. (2011) noted that policy and politics have been driving factors in the recent growth of digital learning. In some states, partisan arguments have sometimes drowned out what should be nonpartisan agendas of using online learning to promote agendas of equity and reducing class size. SEAs are often significantly affected by the politics of K–2 education. Alabama has benefited from the continuity of political leadership in the governor’s office during the period of 2004 to 2011, when ACCESS grew into the third largest virtual school in the country. Relations were strong between the governor and state superintendent, a position appointed by the elected state board of education. The governor is the president of the state board of education. Coordination between the governor’s office and the office of the state superintendent likely played critical roles in securing legislative support for ACCESS. This was particularly true in the first 2 years of the governor’s term. During these 2 years the governor secured \$20 million to develop ACCESS and the technological infrastructure necessary to ensure virtual learning was accessible in all Alabama districts. In turn, this created an environment that allowed the SEA to take on a strong policy leadership role in shaping online learning in Alabama. SEA staff led the Task Force on Distance and Blended Learning, which included the key stakeholders needed to develop the support of legislators, the teachers’ association, higher education institutions, and local districts in funding and implementing a comprehensive state virtual school initiative. The Task Force remains the vehicle for making policy recommendations to the SEA and fostering support, even

as state funding resources declined in 2010–11. The SEA also strategically partnered with its three regional ACCESS support centers to provide the day-to-day management of the program, thereby allowing the SEA to devote its resources to oversight, raising stakeholder awareness, and developing sustainability and long-term funding structures. Whether ACCESS will retain its “monopoly” of online learning in Alabama or enter into competition with private providers in the future is unknown. That could significantly change the role of the SEA in the future.

Florida’s online learning initiatives—and FLVS specifically—received strong support from Governor Jeb Bush, but support from the governor’s office waned after Bush left office. During that period, FLVS grew both inside and outside of Florida and served as the major provider of online education for Florida school districts. Florida SEA’s relationship with FLVS was cordial, but involvement was minimal, with only one staff member assigned to the Office of Virtual Learning. The Florida SEA did not track any virtual programs or course offerings at the district level. That picture shifted beginning in 2011, when legislators, heavily lobbied by private providers, passed legislation that promoted the expansion of virtual charter schools as a means to save money. The appointment by the state board of education (members of which are appointed by the governor) of Gerard Robinson as commissioner of education in 2011 signaled possible changes in the role of the Florida SEA, as he was known as a supporter of public school choice and virtual learning. Robinson’s recently announced resignation, however, casts uncertainty about the future of the agency’s role. Until, and unless, the agency’s staff and resources are expanded, oversight of changes to Florida’s K–12 online landscape may be minimal.

The state superintendent is attributed with the goal of making the Idaho virtual school (IDLA) self-funded and opening the market to vendors of online virtual learning. There is a strong relationship between the governor and state superintendent (both elected in 2008), which has resulted in the Idaho SEA assuming an activist role in policy leadership around online learning. Prior to 2007, the Idaho SEA did not play a significant role in overseeing the IDLA. Not all legislators support some of the Students Come First reform proposals that redirect funding away from teachers or reduce appropriations to IDLA, but it is likely that online learning options will expand in Idaho. The SEA is under significant pressure to help districts respond to the complexity of the Students Come First reforms, particularly the technology pieces of the law, although the responsibilities that the SEA seeks to assume are clear—SEA capacity may be lacking in the short-term.

As the number of district-based programs and virtual charter schools expand across the country, state agencies will be faced with more requirements to regulate and monitor online learning activities, qualifications of teachers, and student learning outcomes. Glass and Welner (2011) pointed out that additional oversight and scrutiny by states is needed if public trust in public virtual education is to be maintained. Those may be difficult tasks for SEAs to accomplish. Among the challenges faced by SEAs are few expectations for funding increases in 2012–13, with some states experiencing funding decreases. To compensate for those cuts, SEAs are reducing personnel costs by leaving positions unfilled or terminating/furloughing SEA staff, as well as offering early retirement incentives. Although most states report having the expertise to carry out reforms, many say they lack the staff or fiscal resources to carry them out (Kober & Rentner, 2012).

State agency personnel interviewed in these three case studies expressed concerns about their ability to handle the oversight and regulation required if faced with a proliferation of virtual charter schools run by many different for-profit and nonprofit organizations. As one state agency

representative commented, policy is lagging behind practice. One could also add that capacity often lags behind policy, too.

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Governors Make the Grade: Growing Gubernatorial Influence in State Education Policy

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Since the 1970s, American governors have become increasingly active in education politics. Where they once told state education chiefs to “make me the best education governor ever,” they now demand control of state boards of education, push for state control of school funding, and urge statewide standards for teacher evaluation. This article surveys the growth of gubernatorial interest in education in Wisconsin, Ohio, and Florida. It argues that sustained financial pressure on state budgets and widespread calls for educational equity have undercut both school districts and legislatures as effective arbiters of education policy. These twin pressures have forced governors, who have a statewide political constituency and are responsible for the state budget, to accept greater control over education policy.

U.S. Secretary of Education Arne Duncan lauded governors’ central role in American education policy in 2009, noting that, “Governors . . . challenged all of us to make education more than a political talking point or an empty slogan.” Duncan was perceptive, but the desire of chief executives to consolidate power over education policy and to take credit for its successes is particular to modern American governors. Wisconsin Governor Lee C. Dreyfus’s mandate to the state’s superintendent was typical of many governors through the early 1980s: “Make me the best education governor ever, okay?” (Shober, 2010, p. 135). He then left virtually all of the details of policy to the state’s Department of Public Instruction (DPI). Although midcentury battles over school desegregation had thrust some governors into school-district politics, especially in the South, few of these leaders had an interest in the day-to-day workings of American education.

That world began to disappear in the 1970s as Americans began to perceive public education as being broken. News magazines trumpeted declining SAT scores, school enrollments were shrinking, teacher strikes were rife, and the U.S. Congress seriously considered a national voucher program. As this malaise settled over public education, the apparent failure of local control to stem the “rising tide of mediocrity” pushed education onto governors’ agendas. Through the 1980s and 1990s, governors’ power grew as many attempted to control state education policy directly. In 1991, Ohio Governor George Voinovich summarized the new sentiment well: “Given . . . the priority that I have placed on education, it is extremely important that I play a significant role. . . . Most importantly, the next Superintendent must have the support and confidence of the

governor if this individual is to succeed.” For governors, at least, education would no longer be a “special” policy.

More than public consternation and governors’ aggrandizement, courts and voters have forced education into state policy agendas. The federal government has placed a premium on accountability for student performance, and many state courts have questioned why unequal school spending in districts should lead to equal results on common state standards. For example, since a New Jersey court ruling in the 1981 *Abbott v. Burke* case, its state courts have mandated that the state spend billions of additional funds on 31 low-income school districts. In 2011, the state supreme court ordered an additional \$500 million (Megerian, 2011). In 2012, plaintiffs told the court in *Lobato v. Colorado* that the state of Colorado should provide an additional \$3 billion—a sum that, if added to existing outlays, would consume 89% of the current state budget (Suthers, 2012). Governor John Hickenlooper (D) argued that “there are more appropriate venues for a vigorous and informed public debate about the state’s spending priorities” than in the courts, namely, between himself and the Colorado legislature (Hickenlooper, 2011).

Voters, likewise, have amended state constitutions to require guaranteed state funding for education. Colorado also faces a constitutional constraint that restricts tax increases but requires annual increases to state funding for education via voter-approved constitutional amendments. Perhaps the most dramatic reflection of this was California’s 1988 Proposition 98, which has instead led to unpredictable school funding (Manwaring, 2005).

In the 1970s, many governors felt comfortable leaving education to school boards and state superintendents because states provided relatively modest payments to districts. Now, the twin pressures of equity and precarious state budgeting have forced governors, who have a statewide political constituency and are responsible for the state budget, to seek greater control over education policy. State executives now must balance state demands for roads, prisons, employee pensions, tourism, and other items against education spending. Although not every governor views education through a fiscal lens, the financial pressures of the last decade have made state education budgets the cornerstone of state budget politics, and thus a problem no governor can avoid.

This article presents the trajectories of gubernatorial power in education in Florida, Ohio, and Wisconsin. In Florida, Governor Jeb Bush made education *the* focus of his administration, and his break-the-mold approach continues to reverberate in state and national education policy circles. In Ohio, governors forged tight links between academic performance and school funding. In Wisconsin, the heritage of strong local control and relatively high state funding led governors to treat education policy as fiscal policy.

FLORIDA: BREAK THE MOLD

Few “education governors” were as true to title as Governor Jeb Bush. Bush illustrates the benefits of coming to office with clear, well-defined policy prescriptions. Yet even considering his bold use of executive power, Governor Bush’s efforts led only to a moment of gubernatorial dominance before other branches of government and voters sought a retrenchment of education policy. Whereas state finances and court decisions thrust education politics into the governor’s hands in Wisconsin and Ohio, voters and courts in Florida restrained gubernatorial desires.

Florida's centralized education governance structure contributed to Governor Jeb Bush's ability to fast-track his favored education policies. Unlike either Wisconsin or Ohio, the state of Florida has authority over many day-to-day school details, including minimum local property tax rates, end-of-course examinations, and even the grading scale (since 1987). Debates over school finance have been less vociferous in Florida in part due to county-wide districts that reduce funding disparities between poor and wealthy neighborhoods. Further, the Florida legislature acted in 1973 to head off challenges that might arise from the California Supreme Court decision, *Serrano v. Priest* (1971). As such, Florida has one of the more equitable finance systems in the United States, with the state government providing the majority of funding in 70% of its districts. In the 2011–2012 school year, total state and local funds provided \$5,804 per student overall, and 64 of the state's 67 districts receive between 95% (\$5,513) and 110% (\$6,384) of that figure.

Nevertheless, Florida's state-centric education governance did not guarantee an activist governor. Indeed, for much of the state's history, the defining institution was the state legislature; one Senate president even warned Governor Reubin Askew (1971–1979) to “stay the h— out of my Senate” (Date, 2005). Florida governors were limited to one 4-year term until the 1968 constitution—even though their independently elected cabinet members were not term limited. Later, legislators from both parties hearkened to these days while they chafed at Bush's activism, yet unlike Askew, Bush “could stare down a bear” and consistently had high public support (Pendleton, 2000). He also had a crystal-clear vision of what he wanted to accomplish as Florida governor. After Bush lost to Democrat Lawton Chiles in 1994 by less than 2% of the vote, he created the Foundation for Florida's Future to keep his ideas (and campaign staff) in the public eye until he could run in 1998. That year, he handily dispatched Democrat Kenneth “Buddy” MacKay by a 55% to 45% margin.

Bush's resilience served him well, but he owed his success as governor less to personality than a shift in voter support for the GOP and for greater gubernatorial involvement in education. Florida voters shifted toward the GOP sooner than most other Southern states as northern and midwestern retirees migrated to the state. Florida gave its electoral votes to the GOP ticket in 1952, 1956, and 1960 and elected Republican governors in 1966 and 1986. Yet not until 1996 did Republicans control both houses of the legislature, and Bush became the first modern Republican governor to have both houses controlled by his party. This partisan support gave him substantial backing to push controversial education reforms.

In 1998, voters also approved two significant changes to the state constitution that opened a policy window for Bush. The first measure eliminated three elected cabinet positions, including the Commissioner of Education, and created a single-purpose State Board of Education that featured members appointed by the governor. Unlike his predecessors, Bush had a free hand to shape state education policy directly through these appointments. By approving these measures, voters deliberately increased the governor's power. Voters also boosted Bush's authority incidentally (or accidentally, according to critics) by approving an amendment that expanded the constitutional requirement for a “uniform system of schools” to one that also required “efficient, safe, secure, and high-quality” schools that “allow[ed] students to obtain a high-quality education” (Florida Constitution 1998, Art. IX, Sec. 1). Advocates of higher state funding had turned to voters after the state supreme court blocked a financial adequacy lawsuit because it would have “present[ed] a substantial risk of judicial intrusion into the powers and responsibilities of the legislature” (*Coalition for Adequacy and Fairness in School Funding v. Chiles*, 1996). Bush interpreted this to mean the state should monitor and require educational results rather than merely increase funding. In sum, Bush could claim solid voter support from his election returns, a free hand

to shape education through the State Board of Education, and voter approval of “high-quality” schools.

That education was Bush’s top priority surprised no one. His running mate, Frank Brogan, had been the elected Commissioner of Education under Governor Lawton Chiles, and Bush’s foundation publicly supported increased standards, testings, and vouchers. His first-term agenda was largely confined to these issues, and Bush immediately put those interests before the legislature upon assuming office. His “A+ Plan” included increased state funding, expanded school accountability with the Florida Comprehensive Assessment Test (FCAT), and a state-wide voucher program for students in low-performing public schools. By the end of his first legislative session—in April—the legislature had obliged and passed all three measures. Bush praised the legislature with rhetoric that foreshadowed later statements by his brother George W. Bush: “Education will remain my top priority until we can honestly say that our system no longer leaves any child behind” (Hollis, 1999b). He pushed on, and in his 2nd year he succeeded in transforming the State Board of Education into a K-20 board, dramatically cutting the authority of individual universities.

Although Bush had never held elected office before, even Democratic critics acknowledged that he proved to be a masterful leader. “I’d like to say he’s done a terrible job and fell flat on his face, but I can’t,” said the chairman of state Democratic Party. “You’ve got to give him good marks on what he’s done” (Crowley, 1999). Nevertheless, Bush’s executive style drew harsh criticism from the legislative branch. When Bush vetoed \$313 million of legislators’ pork-barrel projects, the Democratic senate minority leader complained that “Gov. Bush is attempting to minimize the role of the Legislature in state government. He has substituted his judgment for the House and Senate” (Hollis, 1999a). Those complaints became systematic, and Bush gained the reputation that he would “decide what he wants to do and dictate that to everybody else,” according to a critical legislator (Pendleton, 2000). Another legislator agreed, but said (confusing the metaphor), “You can only pull on Superman’s cape so long as you have kryptonite, and Jeb’s kryptonite is the popular position he has with the people of Florida” (Pendleton, 2000).

Despite Bush’s ability to strong-arm the legislature early in his first term, his education overhaul consumed much of his political capital. The next 7 years quickly turned into a marathon attempt to protect vouchers, the FCAT, and his own vision of Florida education from the courts, voters, and his successor, Charlie Crist.

The introduction of vouchers was Bush’s most dramatic challenge to Florida education system, and it predictably became a lightning rod for controversy. Opportunity Scholarships, as they are called, were Bush’s centerpiece reform. During the legislative debate over the scholarships, he told a wavering Republican senator that “his no. 1 priority [was] vouchers . . . way ahead of other priorities” (Rado, 1999). Ironically, this policy was also the one that affected the fewest students. In 2006, when Opportunity Scholarships were ruled unconstitutional under the state constitution, only 730 students were using them out of 2.6 million public schools students. Two other voucher-like programs aided some 30,000 students (Kormanik & Rushing, 2006). Despite the small numbers, Bush remained strongly committed to vouchers as a logical necessity even if they did not enroll large numbers of students. In Bush’s vision for education, vouchers were an extension to educational accountability. If public schools could not provide an academically supportive environment, parents should have a “second chance” and be able to choose any other school for their children. Consequently, unlike the most notable vouchers programs in the country, Milwaukee, Wisconsin, and Cleveland, Ohio, Florida’s Opportunity Scholarships were not limited to low-income students. Bush said,

We are committed to safe schools and we're committed to the things that will allow principals and teachers and parents to build the best possible schools they can. But I do believe that a consequence, when there's chronic failure, that gives parents other choices including private ones is essential for this. ("Gov.-Elect Bush," 1998)

Although Florida's teachers unions were livid at the governor's plan to grade schools, challenging the idea that the public should be informed about school quality was political suicide. The League of Women Voters, the Florida Parent Teacher Association, and the Florida Education Association instead relied on the state's "Blaine Amendment," which prohibited the use of state funds to aid religious organizations. The combination of county-wide districts and few nonreligious private schools left few genuine choices that were not religiously affiliated, so voiding the participation of parochial schools would effectively kill the program. Trial and appellate judges agreed, but the Florida Supreme Court evaded the church—state question almost entirely in its 2006 decision by focusing on a secondary argument about public support of nonpublic schools. They relied on the same 1998 constitutional change that had empowered Bush to demand measures of school quality. The high court interpreted the provision for "uniform . . . high-quality system of free public schools" to mean that the state could *only* fund public schools (Kormanik & Rushing, 2006; Miller, 2005).

Bush also toiled to protect his vision of education from retrenchment by voters. Although he was ushered into office with voters' goodwill and support, his aggressive measures began to sour voters' appetite for education reform. Although he retained a comfortable job approval margin for his two terms, Bush's "top priority" was frequently at odds with what voters told pollsters they wanted. Near the end of his term, in 2006, 63% of Floridians approved of his job performance—a career high—but 61% opposed vouchers and 70% opposed "penalizing" schools because of student performance on the FCAT (Matus & Winchester, 2006). These marks mirrored a similar level voter dissatisfaction for Bush's handling of education policy in 2002 (Feller, 2002). Bush's vision for education was not the dream of most Floridians.

Bush knew this, of course, and sought to insulate his reforms from direct intervention. Yet, in two notable cases, he failed. First, Florida teachers' unions and Democratic state senator Kendrick Meek spearheaded an effort to cap the number of students in classrooms through a constitutional amendment that limited class sizes in each classroom from Kindergarten through 12th grade. Meek argued that the cost was no object. "It's all about priorities. . . . Every politician has [smaller class sizes] at the top of their brochure. You can't argue against it" (Humphrey, 2001). Bush strongly objected and made an all-out effort to defeat the proposal. He warned that the amendment would cost nearly \$800 million in the 1st year and more than \$10 billion to implement in return for small results. In a closed meeting in October 2002, Bush even told legislators, "I have a couple of devious plans if this thing passes" ("Bush Says," 2002). Nevertheless, the appeal of small sizes overcame fiscal uncertainty, and voters approved the class-size amendment, even as they reelected Bush by a comfortable margin.¹

Second, voters turned back Bush's plans for educational centralization. In 2000, the governor persuaded legislators that the 1998 amendments gave them the authority to abolish the state's

¹ Although Meek and others sought to boost local school funding by tying the entire cost of class size reduction to the state, Florida law allows the Board of Education to fine districts that fail to comply with the amendment. In 2012, the Board planned to levy \$70.1 million in fines on 21 school districts, including \$56 million on Broward County, home of one of the unions that initially supported the amendment (Florida State Board of Education, 2012).

higher education Board of Regents and fold its functions in the appointed state board of education. This bold stroke gave Bush 117 education appointees to fill in 2001 (Feller, 2001a). Insulating both K-12 and higher education from voters did not sit well with Democratic Senator Bob Graham, who called it a “cataclysmic train wreck” (Feller, 2001c). Although a sitting U.S. senator, Graham managed to spearhead an effort to collect signatures and campaign on behalf of an amendment overturning Bush’s merging of higher education into the purview of the State Board of Education. Graham did not take issue with gubernatorial appointments—all but two of the members of the proposed boards were to be appointed either by the governor or by the governor’s appointees—but he instead worried that a K-20 board would subject the state’s universities to “political shenanigans” at the hands of the governor and legislators (Feller, 2001b; “Thwarting Intent,” 2003). Graham prevailed, and voters opted to separate the state university system from the state K-12 system by a margin of 61% to 39%.

These defeats convinced Bush that his education reforms would face opposition when he left office. In the last year of his governorship, he solicited donations for a revived Foundation for Florida’s Future with a letter noting that “we cannot allow future leaders to roll back the reforms that have made a dramatic difference in the educational opportunities of every child in our state” (Smith, 2006). The foundation was private, but Bush tried to keep friends in public places as well. He reappointed two staunch allies to the State Board of Education at the end of his term and hired a Department of Education staff member to “protect legacy issues” (Date, 2007).

Governor Charlie Crist gave credence to Bush’s concerns. Crist was the last elected Education Commissioner before his election as Florida’s attorney general. Although he initially had Bush’s support as Education Commissioner, he was considerably less strident than Bush. As attorney general, he had kept most of the outgoing Democrat’s staff. When he became governor, Crist maintained this bipartisan style. “We will . . . reject labels—red, blue, liberal, conservative, Democrat, Republican. There is only one label that really matters: Floridian,” Crist said in his inaugural speech (Date, Crowley, & Kam, 2007). Crist maintained a very open-handed style of leadership and went out of his way to court support from the teachers’ unions and some Democrats. He also forced out Bush’s most vocal supporters on the State Board of Education and pushed through a teacher-bonus law that minimized the role of FCAT. In fact, Crist made a public trip with both Republicans and Democrats to New York State to investigate alternatives to FCAT (Matus & Bousquet, 2007). Yet, although Crist was able to deemphasize some of Bush’s reforms, he could only do so because of the expanded power voters had given the governor in the late 1990s.

Bush’s experience in Florida illustrated the tenuous impact of a single-minded focus on education, especially education reform. Although he was able to harness voters’ desire for greater educational equity and improved outputs in the 1990s, he was not able to convince his constituents that his vision should be theirs. His reforms were identifiable as “Bush reforms” rather than Florida reforms. They lacked institutional support from courts and the legislature, and even from fellow Republicans. Pollsters consistently found strong majorities opposed to Bush’s marquee reforms even as equal majorities favored Bush’s overall leadership. These conditions combined to make Bush a leader but not a transformer.

OHIO: EDUCATION FOR RESULTS

In Ohio, courts have played a central role in promoting gubernatorial activity in education policy. In the early 1990s, Ohio school districts sued the state for increased funding. In their view, the state did not provide enough money to districts for students to meet state standards, nor did the state

provide aid to districts in an equitable way. At the same time, voters elected a governor committed to linking spending explicitly to academic *results*. This combination of factors opened a Pandora's box for Ohio school districts, as they gained greater equity in return for greater scrutiny. As a consequence of the case, the state's governors—Voinovich, Taft, Kasich, and to a lesser extent Strickland—demanded better school performance for funding, but the case forced them to treat education funding as just another budget line-item competing with other state priorities.

Historically, Ohio's property-tax-based school system gave school districts an immense amount of financial autonomy and local control. The state had virtually no oversight of school policy until 1912, and genuine state academic standards did not appear until 1978 (Ohio State Board of Education, 1989, pp. 84–86; Ray, 1943). Unfortunately for advocates of local control, a severe downturn in tax revenues in the early 1980s undermined this district independence. At that time, several large Ohio school districts clambered to declare bankruptcy because their expenses had outstripped local tax revenue, and they could not pay bondholders. The Ohio General Assembly considered bills forbidding bankruptcy, requiring districts to shorten the school year, and forcing voters to accept new debt. Although the crisis passed and these bills died in committee, districts were stung. Critics across the political spectrum argued that districts could no longer be left to fend for themselves—either financially or academically (Shober, 2010, pp. 165–166).

Enter Governor George Voinovich. Elected in 1990 with a strong backing from the business community, Voinovich had argued on the campaign trail that state bureaucracy was stifling the economic viability of Ohio businesses. He singled out the Ohio Department of Education (ODE) as particularly ineffective. Voinovich argued that education was central to Ohio's economic competitiveness and should not remain a provincial interest of educators. He was especially keen to reengineer the state's ninth-grade proficiency test to make it an accurate barometer for employment, something neither the current superintendent nor ODE had previously supported (Voinovich, 1993). To make way for his own increased involvement, the new governor commissioned an "audit" of the agency performed by business executives from big Ohio firms, including B. F. Goodrich, Goodyear, Proctor & Gamble, and TRW. Voinovich used the report to strong-arm the State Board of Education into allowing him to pick a new, more compatible State Superintendent, despite the board's legal responsibility to do so. He succeeded and selected Ted Sanders, who sought to provide more technical assistance to districts—especially with regards to student assessment—and dramatically more state attention to meaningful academic standards (Durfee-Hidalgo, 1990; Maher, 1991, pp. 13, 22).

Although Voinovich did not speak the language of educational equity, he was finely attuned to the consequences of school districts *without* common standards. In an effort to remedy perceived weaknesses, the governor asked Superintendent Sanders to overhaul the state standards. Since 1987, Ohio had required students to pass a ninth-grade proficiency exam before graduation, but both Voinovich and Sanders found the exam's goals nebulous. The exams certainly did little to address the "skill-gap" that Voinovich alleged existed between Ohio education and employers' needs. Sanders suggested Outcomes-Based Education to Voinovich, an approach that specified "what students should know, be able to do, and be like" (Sensky, 1993). After a brief, intense controversy across the state regarding Outcomes-Based Education, Voinovich retreated from full involvement in the work of the department, but he still sought—and won—the right to appoint a majority to the State Board of Education. He had confidence that their work would reflect his wishes.

Voinovich's efforts reflected what many other governors of his time sought, and so his push for standards was not particularly novel. His emphasis on linking funding to standards, however, was new, and that approach gained steam in the wake of Ohio's decade-long school finance equity and adequacy case, *De Rolph v. Ohio* (1997). Encouraged by the success of Kentucky school districts wringing more money from the state in *Rose v. Council for Better Education* (1989), Ohio districts sought to free themselves from their heavy reliance on local property taxes. The group, known as the Ohio Coalition for Equity and Adequacy of School Funding, argued that the state's funding system was inequitable and inadequate to meet the demands of state standards. The case returned to the state supreme court five times.

In *DeRolph*, however, the districts made a fundamental error. Linking funding to state standards gave Voinovich a green light to link state standards to funding. He had long argued that "our citizens should have greater assurance that they are getting the quality and performance they are paying for," and the state's loss in court gave him leave to link those facets of education (Voinovich, 1997). With the full backing of the governor, State Superintendent John Goff issued a decidedly rosy press release after the state's first court loss in 1997. He wrote,

For the last several years, the State Board and I have focused on raising standards and improving the performance of our educators, students, and schools. I was glad to see the court agrees that if we just talk about money, we can never resolve the school-improvement debate. *We have to talk about results.* (Ohio Department of Education, 1997)

Two months later, Goff echoed Voinovich in a letter to the Speaker of the Ohio House, Jo Ann Davidson:

The adoption of the standards by the end of 1997 will put in place a framework for increased performance and accountability for schools as the state response to the recent Ohio Supreme Court school funding decision. . . . [They are] appropriate mechanisms for ensuring a return on that [school funding] investment. (Goff, 1997)

Those standards became a backdrop for a testing regime even more extensive than that created by No Child Left Behind (NCLB). In 1997, Voinovich pushed for—and received—a quickly written "Academic Accountability Bill" that required higher graduation standards and a "fourth-grade guarantee" that required all fourth-grade students to pass a reading test before promotion (Ohio Senate Bill 55, 1997). It was paired with the "Fiscal Accountability Act" that required districts to spend money on instructional materials and adopt tighter budgeting rules (Ohio House Bill 412, 1997). In the process, Voinovich (1997) wrote the State Board of Education to "aggressively" identify both "excellent" and "deficient" school districts in line with existing state law. He was ultimately disappointed with the State Board's work, and called the Board's attempt at standards "vague," "unrealistic," and burdensome to school districts (Voinovich, 1997). In 1998, as he left for the U.S. Senate, he ordered that a new "audit" of Ohio education be conducted by Achieve, Inc. That document praised major strides in state-level education policy, including legislation promising a 40% increase in state funding and some of S.B. 55's accountability provisions (Achieve Incorporated, 1999). In line with Voinovich's views, the report suggested that although Ohio demanded *student* accountability via proficiency tests, it had virtually no teacher, school, or district accountability (11).

Voinovich's successor, Bob Taft, entered office energized by Achieve's external audit and a court-imposed responsibility to reorganize state funding. In *DeRolph v. Ohio* (2000) ("*DeRolph*

II”), the court explicitly placed education reform in the hands of the state, and later praised Taft’s educational efforts by calling on “the General Assembly, educators, corporate leaders, and parents to join his efforts” (p. 993). Taft *had* been proactive; in April 2000, a month before the ruling, Taft created a Governor’s Commission for Student Success to identify aspects of education that the state could both fund and assess. The Commission suggested a significant overhaul of Ohio’s accountability system, including the creation of five Ohio graduation tests and the expansion of the use of student assessments. Unlike Ohio’s earlier efforts, these tests were meant to be informative for teachers as well as a measure of student learning, and were therefore frequent. A high-level ODE official noted that “Ohio has been able to anticipate the Bush agenda very successfully. Since 1987 [Ohio’s adoption of state tests], we’ve been a rigorous example for NCLB” (Shober, 2010, p. 149). Taft signed a bill implementing his Commission’s reforms 6 months before NCLB. Indeed, when the U.S. Department of Education required states to submit their plans to collect and report student results, Ohio easily submitted its plan early (Sidoti, 2003). Both the quantity and subject matter of the tests, however, meant that districts were given significantly less leeway in how they structured their education programs. Districts had to show a semblance of equality in results in return for state funding over which they no longer had control.

Ironically, the court’s financial demands for a “thorough and efficient” state funding system tethered education spending to the Ohio budget’s own perilous condition. In *DeRolph v. Ohio* (2001) (“*DeRolph III*”), the state Supreme Court demanded what it thought was a minor increase to the state’s baseline formula as a condition for ending the litigation. Taft then endorsed a \$1.4 billion increase in state school spending in his 2002–03 budget, but as tax collections rolled in, it was apparent that Ohio would have a significant shortfall. In addition, the court’s majority had used faulty data from the plaintiff, and the “small fix” would have actually cost an additional \$1.2 billion (Sheridan, 2001). Taft’s options were limited, as voters had defeated a special 1-cent sales tax to support education in 1998. In a final trip to the court, the justices terminated their jurisdiction over the case (Candisky & Leonard, 2003).

Taft appointed another blue-ribbon commission to resolve the funding issue out of court, but its recommendations were not adopted. The result was that school districts embarked on 10 years of financial uncertainty. In the year after the court terminated its involvement, 96 school districts sought additional tax levies, a record for an off-cycle election (Gottschlich, 2004). Still, at the end of his term, Taft claimed his focus on standards and assessment had made Ohio education fairer across the state. He lauded the additional \$10 billion he had put into school construction (Smyth, 2006).

Despite his failure to replace Ohio’s finance formula, his precedent deeply affected his successors. Both Governor Ted Strickland and Governor John Kasich convened commissions to recommend “new” school finance formulae. Indeed, Strickland’s headline promise as a gubernatorial candidate in 2005 and 2006 was to reform education spending, a pledge that was distinctly more difficult to deliver than Strickland expected (Chancellor, 2005). In 2007, a year after winning election, he complained that “I think we’ve got probably all the money we need in education, we just don’t utilize it in a way that is fair and appropriate, but it’s not something that I’m going to allow myself to be tied to a timetable of some kind. . . . I’m confronted with needing the conditions that could really lead to a successful outcome” (“Year After,” 2007). In 2008, the governor was still convening stakeholder meetings about a new school finance model—efforts that the Republican House Speaker panned as essentially the same exercise Voinovich and Taft had engaged in much earlier (Majors, 2008).

The conditions necessary for a “successful outcome” arrived in November 2008, when Democrats took the Ohio senate. At that point, Strickland found assurance that his plan would make it through the legislative process. In February 2009, Strickland finally delivered a plan. He billed it as an “evidence-based model” that accounted for the cost of bringing each Ohio student up to meet Ohio’s state standards. The plan specified changes in teacher compensation, classroom size requirements, provisions for specialty teachers, and extra funding for nonathletic activities. Rather than “residual budgeting,” his plan also called for a panel of education specialists to determine the cost and then require the Ohio General Assembly to provide for funding at that level (Majors, 2009). All of these were much closer to the views of the Ohio Coalition, which tentatively endorsed the proposal (Hershey, 2009). Yet the proposal maintained a firm grip on state standards; Strickland’s evidence-based model required value-added measurement of teacher performance, and he boasted of maintaining Taft’s high accountability standards (Riley, 2009; Strickland, 2010). After a nasty summer budget fight that featured the death and subsequent resurrection of the bill after several temporary state budgets, Strickland could finally claim credit for fulfilling the Ohio court’s initial order—to thoroughly overhaul Ohio’s funding. In early 2010, Strickland argued he had “redefined [Ohio’s] expectations and . . . practices with one core purpose in mind to prepare our students to become critical and creative thinkers who will thrive in the workplace and in life” (Strickland, 2010). Still, Strickland knew his approach would be as politically tenuous as its funding. Ohio had plugged its 2009 budget gap with \$922 million in federal stimulus dollars; without those funds, education funding would have fallen 24% under Strickland (Kissell, 2010). After Strickland lost to Governor John Kasich in the Republican wave of 2010, Ohio lawmakers argued Strickland’s plan was too expensive within the framework of Ohio finances, and they repealed the “evidence-based model.”

Kasich did not replace the formula with a new system, although the governor promised to continue “accountability, choice, and high standards” (Smyth, 2010). Critics blasted the governor for his “nothing-based” formula, but were powerless to force changes (“Ohio Rep,” 2012). The Republican governor promised a new formula would not appear until at least 2013 (“Ohio Rep,” 2012). After courts had taken finance out of districts’ hands and then their own hands, governors’ efforts were plagued by political and partisan instability.

The tight link between academic results and state funding has meant that Ohio’s education politics have become perennial, divisive, and unresolved. All four governors faced the same difficulty of finding an equitable way to distribute funds while demanding “results.” The courts made it *their* responsibility, and voters insisted that funding remain within the confines of the *state* budget. This has not yielded positive results for governors. Voinovich sought power over education to boost his standing with voters and improve Ohio’s business climate, but in this new environment, there is little but loss awaiting governors. What began as a quest for educational adequacy has become an exercise in blame avoidance.

WISCONSIN: EDUCATION AS A LINE ITEM

Wisconsin education politics have long been dominated by local control. Although a modest education agency by any light, the Wisconsin DPI had no authority to regulate one-room school houses in the 20th century (almost 6,000 such schools enrolled approximately one fourth of the school-aged population in 1950). Even in the late 1980s, state superintendent Herbert Grover

found himself turning to media appearances to compel school districts to conform to state standards (Shober, 2010, p. 109). Demands for greater equity between districts and freedom from the vagaries of property tax collections prompted Governor Tommy Thompson and legislators to fund two thirds of education costs in return for tax limits. In the 20 years since, Wisconsin governors have continued to treat education primarily as a fiscal responsibility rather than as an opportunity for innovative public policy.

Thompson's fiscal interests were no secret to his political colleagues. "I am concerned because I feel the Legislature already has mandated too many public school activities and programs (and costs thereof)—leaving school boards and local taxpayers to pick up the tab," Representative Tommy Thompson wrote State Superintendent Bert Grover in 1981 (Thompson, 1981). Thompson went on to become Wisconsin's longest serving governor (1986–2001). Yet, despite his fiscal concern and local-control rhetoric, he had expansive views of his own role in education as governor. He brought public charter schools, private-school vouchers, revised state education standards, and interdistrict open-enrollment to Wisconsin. At one point, he gutted the state's DPI, leaving only \$393,000 of the department's formerly \$2.8 billion budget, while replacing it with a cabinet-level (and gubernatorially appointed) secretary of education. In a not-so-veiled criticism of the state agency, Thompson (1995) said, "This new Department will be a new voice of leadership committed to education reform, committed to meeting the demands of the twenty-first century . . . [and] not a voice for the education establishment" (p. 77). (The agency's budget was later restored.) Policy innovation was not Thompson's core interest in education. His proposed innovations were window dressing for his fundamental desire to see state policy ensure that property taxes were kept as low as possible.

Thompson accomplished this feat by seizing a report compiled by the state DPI to bolster his own tax-cutting claims. His arch-foe, Superintendent Grover, drafted a report in 1983 showing how the property tax was inequitably distributed between school districts. The results only put numbers to a phenomenon that was well known; the property tax did not provide uniform resources across the state. Grover used the report to call for equity in every budget request he sent to the legislature. Thompson, though, took the report to justify limiting property tax levies. In return, he would guarantee that two thirds of education funding would be supplied by the state (Rossmiller, 1990).

Thompson's desire to limit property taxes did not stop at this funding swap. In addition to the limit on property tax levies, he proposed to cap teachers' unions' ability to bargain for pay and benefits. He recognized that the bulk of school costs was in personnel. Unless those costs were limited, pressure on school district finance would be strong. His solution, the Qualified Economic Offer (QEO), placed a local education policy problem in the realm of state law. Under the QEO, teachers' unions could bargain with school districts over pay and benefits, but if the district offered a contract that was at least as generous as the previous contract plus a set percentage, the local bargaining unit had to accept the offer. This statewide cap on contracts predictably raised the ire of teachers' groups—but the QEO reinforced Wisconsin policymakers' financial approach to education (Watchke, 1998).

By one measure, Thompson was overwhelmingly successful. The average property tax mill rate declined 43% between 1996 and 2006, and voters were able to accept or reject additional school levies through referenda (Reschovsky, 2007). In the 5 years before the QEO was enacted, property tax levies increased an average of 9.15% each year; in the 15 years after QEO, the levy increase exceeded 7% only twice, and was less than 5% in 9 years (Wisconsin Department of Public Instruction, 2012). By other measures, however, Thompson's education policy left Wisconsin

governors *only* able to address school funding. Levy limits, the QEO, and calls for more equitable school funding left school districts seeking voter approval for multiple referenda, teachers' unions lobbying for the overturn of QEO, and discussions of virtually all state school policy devolving into discussions of school finance. For example, both the state's voucher program and its charter school program have repeatedly been criticized for their effect on the state's distribution of school funds. The largest teachers' union in Wisconsin, the Wisconsin Education Association Council (WEAC), claimed that expanding some charter schools in Wisconsin "would result in a direct reduction on each school district's general aid payment from the state" (WEAC, 2011). Similarly, Milwaukee mayor Tom Barrett called the state's voucher program "a lousy deal" for city property tax payers (Barrett, 2007).

For Thompson, limiting local property taxes fulfilled his political goal without entangling the state in the local control of education policy—except, of course, in its fiscal claims. But that coup has made education funding dominate the state budget. In fiscal year 2011, school aids consumed 39.4% of the state budget, a larger line item than Medicaid, higher education, and corrections combined (Wisconsin Department of Administration, 2011, p. 9). In flush times, this has only been inconvenient for legislators with other priorities. But as Wisconsin's state budget came under strain in the early 2000s, both Democrat James Doyle and Republican Scott Walker faced difficult choices about the state's fiscal involvement in education policy, all while maintaining a veneer of local control.

Jim Doyle was substantially friendlier to the "education establishment" that Thompson opposed, and his major education push was to keep education funding high. In 2003, he signed a budget that repealed the state's commitment to two-thirds funding. Although this attempted to bring the state's budget into balance, Wisconsin continued to relegate in excess of 60% of its budget to education. Doyle also quashed an expansion of the state's voucher program by citing a \$2,700 cost per child to Milwaukee taxpayers and \$3,300 cost per student to other taxpayers (Doyle, 2003). When finances continued to worsen through the decade, Doyle promised at least flat funding, arguing that "we cannot allow our children to be the ones who pay the cost for this recession" (Hetzner, 2009). His major education accomplishment, however, was repealing the QEO. He had repeatedly inserted this request into his budget proposals, but Republicans repeatedly stripped out the language until Democrats gained majority control of the Wisconsin legislature in 2008. When Democrats easily repealed the QEO, the WEAC recognized that, whatever its faults, the QEO guaranteed increases in compensation, even in a recession. Thus, the organization lobbied to delay the repeal 1 year, to July 2010; a concession—that benefits were a key driver of school costs—provided a backdrop for Governor Scott Walker's more dramatic overhauls when he won the office that fall (WEAC, 2009).

Doyle also had tried to overhaul Thompson's system of spending caps by encouraging regional cooperation and some pension and benefit reforms, but Democrats were divided on this issue. School board lobbyists worried that his proposal would not allow districts with a low property-tax base to supplement state aid sufficiently. Teachers' unions disliked his plan because it could encourage school districts to drop WEAC-sponsored health insurance in favor of a state plan. Others argued that the plan would not adequately account for inflation, and so he withdrew it in early 2010, leaving future governors to cover the now-uncertain future of local education funding (Stein, 2010).

By 2010, school boards could not contain teacher salaries and benefits through the QEO, and the state would not guarantee funding—yet districts still faced the threat of revenue caps that

voters in many districts were loath to break. As state budget finances dominated the race for governor that summer, Democratic and Republican candidates for governor were cognizant of its connection to school finance. Republican Scott Walker, his fellow Republican Mark Neumann, and Democrat Tom Barrett agreed that revenue caps were crucial in keeping local taxes in order, although they disagreed about how to re-create predictable school finance. Walker urged limits on teacher pay; Barrett sought increased collaboration.

Walker became governor in January 2011 with a projected \$2.7 billion deficit in the next budget cycle. He moved quickly to pass a handful of tax credits and other measures he argued would spur Wisconsin job growth, but these were submerged in a raucous debate in February to close the \$137 million deficit in the current budget cycle. In the budget repair bill (known after passage as Act 10), Walker proposed requiring public-sector employees to contribute significantly more to their pensions and health care costs than they did at the time. "I hope that our state employees feel as if they've been treated fairly over the years," Walker said. "But—like all of us—they should recognize that we are in difficult economic and fiscal times. . . . We must right size our government. That means reforming public employee benefits" (Walker, 2011b). The state's major public-sector unions grudgingly agreed that such a change was acceptable in tight economic times, but Walker took them by surprise when he also sought to restrict collective bargaining to wages and eliminate the government payroll deduction for union dues—at all levels of government. For state employees, full collective bargaining had only been granted in 2002, so Walker's bill was not a great departure from recent practice. Yet Walker's true targets were not state workers. Instead, he argued that the changes would "give state and local governments the tools to manage spending reductions" (Walker, 2011a).

Although the bill included municipalities, Walker aimed squarely at school districts. Walker knew that he would be proposing a 10% cut in state aid, a sum that was approximately equal to his proposed increased in employee benefit contributions. To support his claim, he released an analysis in March showing that more than three fourths of the state's school districts could maintain their existing level of funding by increases in employee contributions to benefits. Education was again framed as an economic issue: Walker's spending reforms would ensure that school districts would "have maximum flexibility to preserve jobs and protect the curriculum" (Hetzner, 2011). Teachers became the face of protests that filled the state capitol for 2 weeks as the state's teachers' unions and others bused in thousands of teachers and their supporters to protest the partial loss of collective bargaining. Their nationally televised protests spurred a marathon 61-hr debate in the state assembly and encouraged 14 Democratic senators to leave the state, denying the GOP senate majority a quorum. Although Act 10 did pass and survived several legal challenges, teachers' unions did not forget. Opponents of the act forced an unsuccessful gubernatorial recall election in June 2012. Walker prevailed.

Whatever their merits, Walker's reforms illustrate how school finance continues to structure Wisconsin education politics. In line with Thompson and Doyle, he left school districts with significant autonomy over classrooms and curriculum. Walker did not require any school district to revise its benefits, employee policy manuals, or seek new taxes; but many did. State budget pressures gave Walker rhetorical cover to fundamentally overhaul decades of tense relations between school boards and teachers' unions. Although Walker supported other elements of education reform to improve the state's chances for Race to the Top funding, his educational platform remained economic.

Thompson's effort to fix the state's overbearing education agenda has led to a biennial fight about the costs of education and education reform. Unlike Florida's policy-first experiments under Bush, substantive policy disagreements in Wisconsin are left to lurk in fiscal language. Unlike in Ohio, Wisconsin governors continue to see wider political advantage by treating education as fiscal policy despite its sharply divisive nature. Doyle bolstered Democrats with the repeal of QEO, and Scott Walker maintained stratospheric support among Wisconsin Republicans in the wake of Act 10 (88% approval in July 2012; Marquette University, 2012). In an unusual twist, this approach has freed governors from accountability about whether education "works." They only must ensure that education pays.

CONCLUSION

Governors have moved boldly into education policy in the last 30 years. Executives like Dreyfus, content to leave education to the experts, are all but extinct. Voter concern about property taxes, educational governance, and even teachers' rights and privileges in collective bargaining have forced governors to enter the arena. Courts' imposition of educational equity and adequacy standards has likewise prompted education funding to drive state budgets nationwide. Yet, for all the wishes of Voinovich, Thompson, Strickland, and others, education policy has shown few benefits for active governors.

Education policy may no longer be "exceptional" among state policies, but it still is identifiable (Henig, 2010). Education funding is not like transportation, prisons, women's shelters, or Medicaid. These programs may affect millions of state residents, but these line items do not employ thousands of *government* employees. Treating education like "just another budget item" ignores the political fact that teachers are the largest sector of government employees in every state. They have a vested interest in government policy, and they have few job opportunities outside the public sector to pursue the same line of work. Thus, teachers are a powerful political force with which no other state policy area can compete. Florida's Bush found that the pull of teachers helped destroy voter confidence in the FCAT, and teachers helped drive voters to the polls in favor of small class sizes. Like Walker, Ohio's Kasich found that teachers will mobilize in defense of their interests as they helped overturn a collective bargaining bill similar to Wisconsin's at the polls in 2011. The secular trend of increasing state funding will only exacerbate tensions between these locally hired employees whose compensation is shaped by governors' budget maven.

Still, the continuing nationalization of education suggests that governors' influence will increase. Although the implementation of the Common Core State Standards may create less diverse curriculum, it has been governors who appoint and oversee panels designing their states' approach to the reform. The Obama administration's Race to the Top saw *governors* scrambling to cajole legislators to change state law to increase their states' funding chances. And new federal accounting standards for state pension liabilities will further highlight long-term state budget weaknesses that can only strengthen the hands of governors. In a bid for more power over Ohio education, Ted Strickland told legislators in 2008 that "the most important duty of the state should not be overseen by an unwieldy department with splintered accountability" (Stephens, Starzyk, & Okoben, 2008). Yet as governors have become linchpins of education policy, they may find that accountability comes harshly.

AUTHOR BIO

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Precursors to Policy Innovation: How Tennessee Entered Race to the Top

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This article examines the education policy environment in Tennessee that preceded a comprehensive reform bill enacted to enhance the state's Race to the Top application. Through interviews with key policymakers in Tennessee, I describe how recent reform efforts undertaken at the state level positioned Tennessee as a strong contender for the Race to the Top funding. My analysis is framed by Mazzoni's (1991) conceptualization of precursors to policy innovation, and my findings reframe this theory to include an additional stimulus for major change. In doing so, I renew attention to education policymaking initiated at the state level and offer an expanded explanation for the political context that precipitates innovation.

INTRODUCTION

In 2010, Tennessee became one of two states to win the first round of Race to the Top. For a state that is consistently ranked lower than most other states when it comes to test scores, graduation rates, and curriculum rigor (Institute for a Competitive Workforce, 2007), its successful bid in the competition caught many by surprise. However, Race to the Top did not instigate Tennessee's efforts to reform education; rather, these reforms had been building for several years prior.

Scholarship addressing reform efforts tends to either consider the role of the state in the 1980s and early 1990s (e.g., Furhman, 1987; McDermott, 2009; Timpane & McNeill, 1991) or concentrate on states' more recent responses to No Child Left Behind (e.g., Carnoy & Loeb, 2002; Goertz, 2005; Porter, Linn, & Trimble, 2005; Wanker & Christie, 2005). Thus, innovations in current state policymaking remain underexamined. Tennessee's success with Race to the Top offers an opportunity to investigate recent policy changes that preceded and strengthened the state's application.

Race to the Top, one of President Obama's education reform initiatives, invited states to submit applications for federal grant awards to support improvements in education. The competition was announced in 2009 and allocated \$4.35 billion from the American Recovery and Reinvestment Act to the program to Race to the Top. Applicants received a score of up to 500 points based on the following six criteria: state success factors, standards and assessments, data systems to support instruction, great teachers and leaders, turning around lowest achieving schools, and general selection criteria. In the end, all but four states, including the District of Columbia, applied to

at least one round of the competition. The state declared fewer than half of these applicants as winners (see Table 1 for a list of states, Race to the Top applicants, and winners by round).

When the competition was announced, Tennessee found itself in an enviable position. The state could demonstrate progress in three of the areas outlined by the competition: standards and assessments, the general selection criteria, and data systems to support instruction. As part of the application process, the state legislature enacted comprehensive education reform, as proposed by the governor. This study examines how Tennessee's recent education policy environment was an important precursor to entering and winning the Race. Specifically, it considers the pressures the state faced to improve education; describes the participants in the policymaking process, including the efforts of a proactive policy entrepreneur; and provides the rationale for innovation at the local level that affected this progression. In doing so, this study seeks to bring additional attention to state education policymaking and offers an expanded explanation for the political conditions that facilitate innovation.

A review of the extant literature on state policymaking and presentation of the political science framework that undergirds this study follows this introduction. The third section presents the methodology for this study, whereas the fourth section describes my findings. The article then features a discussion of the results, and it concludes with policy implications and recommendations for future research.

LITERATURE ON STATE POLICYMAKING

The contemporary role of the state in education policymaking and implementation has developed over several decades. Although such decisions were once left to educators, concerns about a state's economy coupled with pressure from the business community to reform education gave way to a new regime in education reform (Fusarelli, 2005; Gittell & McKenna, 1999). Governors and state legislators, and in some cases chief state school officers, emerged as the main forces shaping education policy, with state boards of education and departments of education assuming secondary roles (Brady, 2009; Fuhrman, 1987; Mazzoni, 1994). Several factors coalesced to bring about these changes in the early 1980s.

Educators to Politicians

Although authority for education had once been the purview of local education agencies (Timar, 1997), concerns over special interests and demands about collective bargaining subsequently fragmented the power of educators (Fuhrman, 1987). In the 1970s, two more events further shifted authority of governance from educators to elected leaders. First, state departments of education began to focus more on monitoring compliance of federal programs and less on matters of curriculum, thus diminishing their involvement in state policymaking (Timar, 1997). Their role was further curtailed in the early 1980s when cuts in federal spending necessitated reductions in staff (Fuhrman, 1987).

Second, states began to address school finance reform. The 1970s were characterized by school finance litigation as districts were forced to address the inequitable distribution of resources to schools (Manna, 2006). School finance was the one area in education where governors and

TABLE 1
States and Race to the Top competition

State	Applied 1st Round	Finalist 1st Round	Winner 1st Round	Amount	Applied 2nd Round	Finalist 2nd Round	Winner 2nd Round	Amount	Applied 1st or 2nd Round	Winner 3rd Round	Amount	Gates Foundation Grant
Alabama	Yes	No	-		Yes	No	-		Yes	-		Yes
Alaska	No	-	-		No	-	-		No	-		
Arizona	Yes	No	-		Yes	Yes	No		Yes	Yes	200 mil	Yes
Arkansas	Yes	No	-		Yes	No	-		Yes	-		Yes
California	Yes	No	-		Yes	Yes	No		Yes	No		
Colorado	Yes	Yes	No		Yes	Yes	No		Yes	Yes	200 mil	Yes
Connecticut	Yes	No	-		Yes	No	-		Yes	-		Yes
Delaware	Yes	Yes	Yes	100 mil	-	-	-		Yes	-		
District of Columbia	Yes	Yes	No		Yes	Yes	Yes	75 mil	Yes	-		Yes
Florida	Yes	Yes	No		Yes	Yes	Yes	700 mil	Yes	-		Yes
Georgia	Yes	Yes	No		Yes	Yes	Yes	400 mil	Yes	-		Yes
Hawaii	Yes	No	-		Yes	Yes	Yes	75 mil	Yes	-		
Idaho	Yes	No	-		No	-	-		Yes	-		
Illinois	Yes	Yes	No		Yes	Yes	No		Yes	Yes	200 mil	Yes
Indiana	Yes	No	-		No	-	-		Yes	-		
Iowa	Yes	No	-		Yes	No	-		Yes	-		Yes
Kansas	Yes	No	-		No	-	-		Yes	-		
Kentucky	Yes	Yes	No		Yes	Yes	No		Yes	Yes	200 mil	Yes
Louisiana	Yes	Yes	No		Yes	Yes	No		Yes	Yes	200 mil	Yes
Maine	No	-	-		Yes	No	-		Yes	-		
Maryland	No	-	-		Yes	Yes	Yes	250 mil	Yes	-		
Massachusetts	Yes	Yes	No		Yes	Yes	Yes	250 mil	Yes	-		Yes
Michigan	Yes	No	-		Yes	No	-		Yes	-		

Minnesota	Yes	No	-	No	-	-	Yes	-	Yes
Mississippi	No	-	-	Yes	No	-	Yes	-	Yes
Missouri	Yes	No	-	Yes	No	-	Yes	-	Yes
Montana	No	-	-	Yes	No	-	Yes	-	Yes
Nebraska	Yes	No	-	Yes	No	-	Yes	-	Yes
Nevada	No	-	-	Yes	No	-	Yes	-	Yes
New Hampshire	Yes	No	-	Yes	No	-	Yes	-	Yes
New Jersey	Yes	No	-	Yes	Yes	No	Yes	Yes	200 mil
New Mexico	Yes	No	-	Yes	No	-	Yes	-	Yes
New York	Yes	Yes	No	Yes	Yes	Yes	Yes	-	Yes
North Carolina	Yes	Yes	-	Yes	Yes	Yes	Yes	-	Yes
North Dakota	No	-	-	No	-	-	No	-	Yes
Ohio	Yes	Yes	-	Yes	Yes	Yes	Yes	-	Yes
Oklahoma	Yes	No	-	Yes	No	-	Yes	-	Yes
Oregon	Yes	No	-	No	-	-	Yes	-	Yes
Pennsylvania	Yes	Yes	-	Yes	Yes	No	Yes	Yes	200 mil
Rhode Island	Yes	Yes	-	Yes	Yes	Yes	Yes	-	Yes
South Carolina	Yes	Yes	-	Yes	Yes	No	Yes	No	Yes
South Dakota	Yes	No	-	No	-	-	Yes	-	Yes
Tennessee	Yes	Yes	Yes	-	-	-	Yes	-	Yes
				500 mil					

(continued on next page)

TABLE 1
States and Race to the Top competition (Continued)

State	Applied 1st Round	Finalist 1st Round	Winner 1st Round	Amount	Applied 2nd Round	Finalist 2nd Round	Winner 2nd Round	Amount	Applied 1st or 2nd Round	Winner 3rd Round	Amount	Gates Foundation Grant
Texas	No	-	-		No	-	-		No	-		Yes
Utah	Yes	No	-		Yes	No	-		Yes	-		
Vermont	No	-	-		No	-	-		No	-		
Virginia	Yes	No	-		No	-	-		Yes	-		
Washington	No	-	-		Yes	No	-		Yes	-		
West Virginia	Yes	No	-		No	-	-		Yes	-		Yes
Wisconsin	Yes	No	-		Yes	No	-		Yes	-		Yes
Wyoming	Yes	No	-		No	-	-		Yes	-		
Totals	41	16	2		36	19	10		47	7		14

legislators had a history of involvement, and their leadership in this area was a natural product of previous participation (Fuhrman, 1987). The rise in gubernatorial and legislative interest in education was furthered by growing concerns over the economy and led to the promotion of state policies concerning curriculum, graduation requirements and teacher quality (Brown, 2008; Fuhrman, 1987; Fusarelli, 2005; Vergari, 2009). A final contributing factor to this shift was the political behavior of educators. Teacher and principal interest groups tended to be reactive rather than proactive (Fuhrman, 1987). This stance distanced them from the policymaking process, unintentionally ceding power to the state.

By the late 1980s and the early 1990s, in response to public concern and as education consumed a larger portion of states' budgets, governors became even more enmeshed in the politics of education (Mazzoni, 1994; McDonnell, 2009). In 1989, governors convened in Charlottesville, Virginia, for an education summit. One of the meeting's leaders was then-governor of Arkansas, Bill Clinton. The outcome of this meeting was a set of national goals intended as a framework to help states develop their own standards (Tirozzi & Uro, 1997). Another important outcome of the meeting was the agreement that education governance should remain state led but also an acknowledgment of the importance of the federal role in funding education (Tirozzi & Uro, 1997). Changes in education policy undertaken by individual states and the work of the governors at the summit have since become contributing factors to the federal government's foray into the accountability-based policies applied across the nation today (Wong & Sunderman, 2007).

Arena Model

The multitude of actors who participate in state policymaking for education and the variability surrounding their role precludes uniformity across the states. It can also provoke conflict within a state as officials negotiate their authority. To facilitate understanding of these dynamics, scholarship on the politics and policies of education is often advanced through the lens of political science frameworks. For this reason, and because of its applicability to state policymaking, Mazzoni's (1991) arena model provides a conceptual framework for analyzing the results of this study.

The arena model examines how actors and ideologies vie for attention in the state agenda-setting process. The model then expands to analyze the contextual influence specific sites have in provoking major policy change (Bastedo, 2007; Mazzoni, 1991). Mazzoni (1991) drew on case studies of state-level education policymaking and previous literature to hypothesize a framework for addressing "how policy develops" questions in policy development and transformation. The model examines how the policy environment provokes innovation, the arena where policy decisions occur, and the outcome of these efforts. The focus of this article is on the policy environment. The interaction between Tennessee's policy environment and political arenas is the subject of another work (Finch, 2012). The arena model identifies two environmental sources that provoke innovation: pressures for change and available revenue (Mazzoni, 1991).

Pressure for change is generated by several forces including public opinion, policy entrepreneurs, organized interest groups, and a crisis event (Kingdon, 1984; Mazzoni, 1991). In particular, Mazzoni (1991) emphasized the role of political elites as a source of pressure because of their access to necessary resources and their ability to proactively advance an issue. These factors, often working in conjunction with one another, bring attention to a problem and stimulate an interest in policy change, thus prompting an issue to become an agenda item (Downs, 2005;

Kingdon, 1984). In this study, I use Mazzoni’s conceptualization of environment pressures to examine recent education reform efforts in Tennessee.

In addition to pressure for change, Mazzoni (1991) found that policy innovation is facilitated by the availability of new revenue. These two elements—pressure and revenue—must work in tandem with each other as the presence of just one is unlikely to result in a major change. However, Fowler (1994) disputed this and did not find evidence supporting this in her application of the arena model in Ohio. Thus, this study also provides an opportunity to consider how Race to the Top’s promise of money contributed to Tennessee’s decision to enter the competition.

METHODOLOGY

This article reports results from one component of a larger qualitative case study of Tennessee’s education policy environment prior to Race to the Top, the state’s efforts in applying for the competition, and initial strides toward implementing legislation enacted during this time. A case study is appropriate to this study because it “investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2009, p. 18). To understand the environmental forces that opened a window for widespread change in education policy in Tennessee, I conducted interviews with key state policymakers and analyzed primary and secondary source documents.

In fall 2011, I conducted four interviews with legislators who held leadership roles in the General Assembly in 2010 as well as interviews with seven public employees who participated in Tennessee’s bid for Race to the Top. The nonelected study participants (Table 2) represented four members of the governor’s staff, one Department of Education bureaucrat, and two officials from the Tennessee Education Association. Interview participants were identified by state legislators (interviewed for the larger project) as instrumental in preparing the state’s application for Race to the Top. Utilizing snowball sampling allowed me to reach saturation point where no new information was introduced (Corbin & Strauss, 2008). Interviews ranged in duration from 14 min to 65 min, with a typical interview lasting approximately 30 min.

Interview data were supplemented with archival document analysis, which included primary source documents relevant to the legislative process, such as Race to the Top guidelines, the First

TABLE 2
Sample description

	Sample (n = 11)
State Legislators	
Representatives	2
Senators	2
Public Employees	
Governor’s staff (former)	4
Tennessee Department of Education	1
Tennessee Education Association	2

to the Top legislation, Tennessee's Race to the Top application, text from the governor's speeches, and secondary sources such as news articles from the *Tennessean* and other media sources.

In keeping with the fluid nature of qualitative research, data collection and analysis occurred simultaneously (Corbin & Strauss, 2008; Patton, 2002). I took detailed field notes following each interview, paying attention to moments where participants echoed (or disputed) what others had said, or when they suggested a new line of inquiry. In preparation for data analysis, interviews were transcribed verbatim and all data were uploaded to NVIVO, a software program for analyzing qualitative data.

Data analysis was guided by, but not confined to, the general themes of the conceptual framework for this study, thus permitting unanticipated themes to emerge (Lincoln & Guba, 1985; Patton, 2002). Following this initial coding, I examined the categories, looking for similar and contrasting dimensions. This iterative process can identify relationships within and across codes and facilitates theoretical saturation, the point in which no new themes arise (Corbin & Strauss, 2008). Throughout my analysis, I endeavored to establish trustworthiness by attending to elements of the data that appeared to contradict emerging patterns, triangulating the data across methods, and recoding sections of transcripts for consistency (Guba, 1981; Patton, 2002).

RESULTS

Mazzoni (1991) identified several factors in the environment that bring pressure for change to the policy system including a crisis event, public and media outcry, and the organization of political elites and policy entrepreneurs. Figure 1 gives a summary of the arena model environment applied to Tennessee. Here I present an analysis of these environmental stimuli.

Early Education Reform Efforts

Prior to 2007, Tennessee had a history of intermittent education policy change. In 1991, the Tennessee Value-Added Assessment System was introduced. This longitudinal data system tracks student growth on standardized tests and links students with teachers and schools. A year later, in 1992, the Basic Education Plan was implemented. The Basic Education Plan is a funding formula for ensuring equitable instructional, classroom, and nonclassroom related allocations to schools across the state. Ten years later, in 2002, lawmakers authorized 50 charter schools for children attending public schools that failed to make Adequate Yearly Progress.

Crisis Event

Tennessee might have continued along this path of making intermittent changes to education policy had it not been for the publication of the U.S. Chamber of Congress's *Leaders and Laggards: A State-by-State Report Card on Educational Effectiveness* report in 2007. This study addressed concerns in the business community that students were not adequately prepared to succeed in college or the modern workplace. Each state was graded on nine categories, including academic

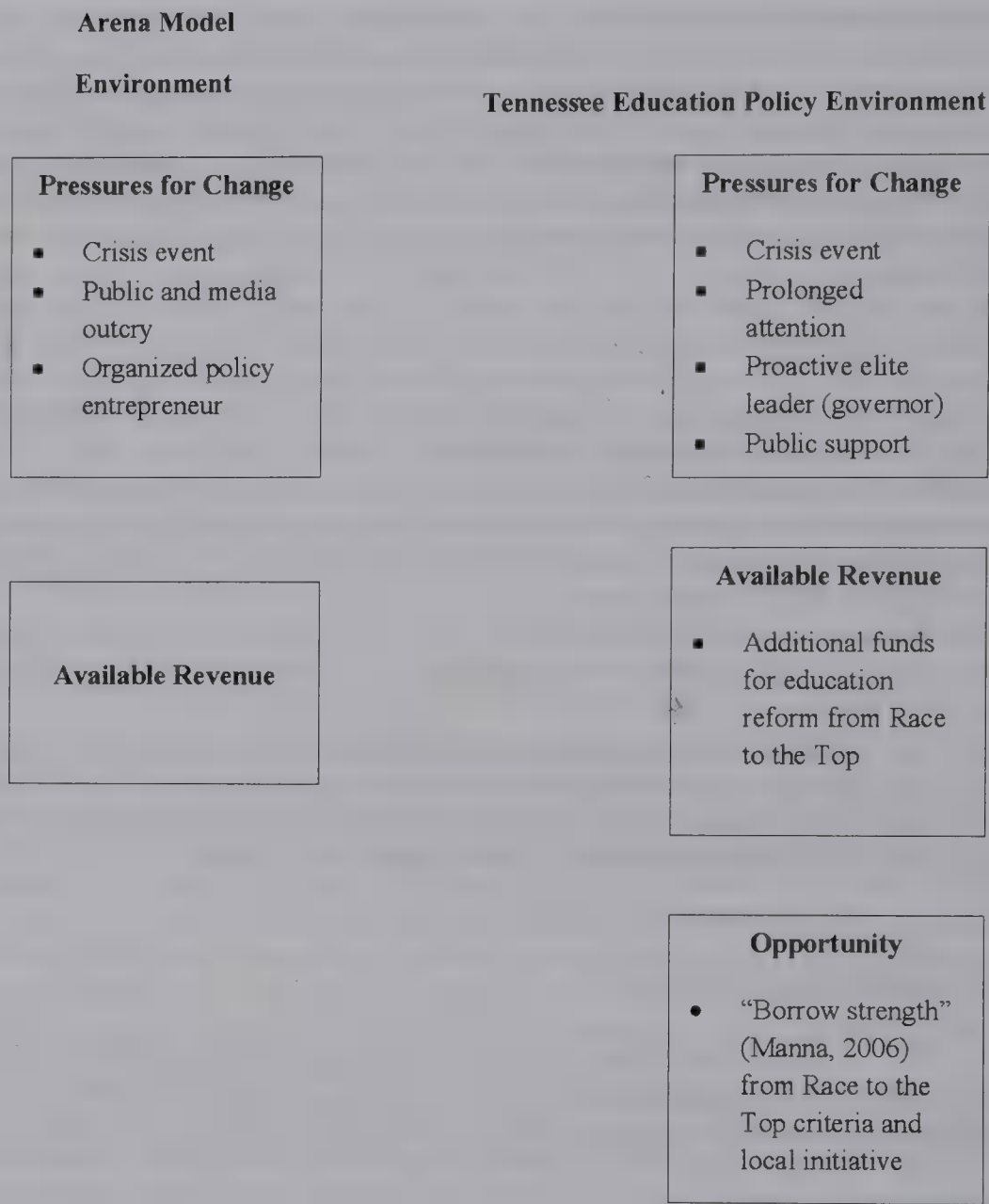


FIGURE 1 Arena model environment applied to Tennessee’s education policy environment. Adapted from “Analyzing State School Policymaking: An Arena Model” by T. L. Mazzoni, 1991, *Educational Evaluation and Policy Analysis*, 13, p. 120.

achievement on the National Assessment of Educational Progress (NAEP), examinations to rigor of standards, and flexibility in management.

Tennessee received a failing grade in three of the nine categories, including the academic achievement of low-income and minority students, postsecondary and workforce readiness, and a category called *truth in advertising* about student proficiency (Institute for a Competitive Workforce, 2007). This category compared the percentage of students the state identified as

proficient on math and reading exams to the percentage of proficient students on the NAEP in 2005. Tennessee's score reflected the large discrepancy between the two examination systems, with far more students scoring proficient on state assessments than on the NAEP. One bureaucrat at the Tennessee Department of Education called it the "Cream Puff Award" for having such a large gap and not trying to remedy it.

In my interviews, five participants mentioned the significance of this report. According to one state senator, when *Race to the Top* was announced, the state's concerted attempt to reform education

had been building over several years, actually, beginning with, I guess, even as early as '07. The truth in advertising is that the National Chamber of Commerce had put on Tennessee. So there were a lot of conversations going on statewide at different levels.

The publication of this report signified a crisis for the state and instigated a prolonged issue-attention cycle (Downs, 2005), bringing Tennessee's struggling schools to the top of policy agendas and putting pressure on policymakers for change.

Proactive Leader

Following the publication of this report, Tennessee policymakers embarked on a statewide campaign to alter the state's reputation as an education laggard. This "modern education movement" as termed by one former Bredesen advisor began "in 2007 during the standards movement," and "laid the foundation for a much more aggressive set of reforms and the *Race to the Top*." This movement was led by Governor Phil Bredesen and encompassed changes to the traditional public system like education funding and curriculum standards, as well as innovative reforms like school choice. The arena model stipulates the importance of proactive policy entrepreneurs, like the governor, in stimulating policy innovation (Mazzoni, 1991). Indeed, in Tennessee, Governor Bredesen initiated reform efforts and brought other participants into the process.

The reform efforts that Governor Bredesen pursued became areas where the state could demonstrate progress for the *Race to the Top* application. Table 3 shows the areas of alignment between the *Race to the Top* criteria and education policy in Tennessee when the competition was announced. To begin, Bredesen encouraged the successful enactment of the Basic Education Program 2.0, which increased the state's contribution to education and lowered the student-teacher ratio. Making education funding a priority was one component of *Race to the Top*'s general criteria category, and so this became important in the state's application.

Widespread Participants to the Policy Process

During this time, and under Governor Bredesen's leadership, the state embarked on the Tennessee Diploma Project with the national education reform organization, Achieve. As part of this collaboration to prepare students for college and careers, Governor Bredesen initiated conversations about raising curriculum standards with education and business stakeholders across the state. The State Board of Education, rather than the governor, is responsible for approving curriculum

TABLE 3
Areas of alignment between Race to the Top and education policy in Tennessee

Race to the Top Criteria	Education policy in Tennessee when the competition was announced
Standards and Assessments (70 points)	
1) Develop and adopt common standards	1) 2007 Joined American Diploma Project
2) Develop and implement common assessments	2) 2008 Approved new standards
3) Support transition to enhanced standards and assessments	
Data Systems to Support Instruction (47 points)	
1) Longitudinal data system	1) TVAAS 18 years of longitudinal data
2) Accessing and using state data	
3) Use data to improve instruction	
General Selection Criteria (55 points)	
1) Make education funding a priority	1) 2007 Basic Education Program 2.0 for equitable funding of schools
2) Ensuring successful conditions for charters and other innovative schools	2) 2009 legislation expanded cap on charter schools
3) Demonstrate other significant reform conditions	

changes, and, despite the fact that most State Board of Education members were Bredesen appointees, so presumably persuading them to agree would have been easy, the governor took a different tact. As one former advisor to the governor explained,

instead what he wanted to do was to build a public case for it. So he had roundtable discussions all across the state with business leaders and CEOs talking to them about what was currently lacking in work force skills; what's not being addressed by the human capital they're getting out of high schools.

More than 100 business leaders joined in the roundtable discussions about curriculum standards hosted by the governor. Participation from this community persisted throughout the Race to the Top application process and into the development of the educator evaluation system. These conversations brought the need for serious change in the education system to the forefront of public and political attention. Subsequently, in 2008, the State Board of Education adopted new K-12 curriculum standards in all subject areas. These actions, coupled with the state's participation in the American Diploma Project, would later indicate commitment to Race to the Top's emphasis on standards and assessments, another category on the application.

Three former members of the governor's staff spoke specifically about Bredesen's efforts to improve education by strengthening standards and assessments. One of these individuals declared that the state had "done all of the things that the application asked for . . . with the exception of the evaluation." Another, referring to the Race to the Top application priorities, stated that "the federal Race to the Top program just teed it up so nicely (for Tennessee), because of the four pillars, we arguably were pretty strong in most of them." Finally, one former policy advisor spoke about how Tennessee's previous work to improve standards was inadvertently a "cornerstone for Race to the Top."

Another effect of these conversations was expanding participation in the policy process to business and community leaders as well as the education foundation, SCORE. Former U.S. Senator Bill Frist founded the Tennessee State Collaborative on Reforming Education Commissions (SCORE), an organization dedicated to working with state and local governments to advance education policy reform. SCORE held town hall meetings across the state to gather information about the state's education priorities. Eight interview participants specifically mentioned SCORE and its role in education reform. According to one legislative leader, SCORE

brought in everybody from teachers, to the principals, the parents to the non-profit organizations, to the foundations, to the business people, the government folks, you name it. And to begin to kind of develop this consensus that we have to do something in Tennessee.

Statewide efforts were not limited to reforms within the traditional public education system. At the urging of the governor, and after a contentious battle in the state legislature, approval was given to expand the charter school cap to 90 schools and to extend enrollment to low-income students. Facilitating charter schools was another important element in the Race to the Top application. Finally, endeavors to improve Tennessee's schools were not restricted to state participants. The Bill and Melinda Gates Foundation awarded Memphis City Schools a \$90 million grant as part of its Teacher Effectiveness Initiative. The significance of this external agency's involvement in Tennessee cannot be underemphasized, as the Foundation was the top-ranked philanthropy and the third-highest-ranked organization overall in a 2006 report of the leading influences in education policy (Swanson & Barlage, 2006).

A final area where Tennessee education policy aligned with Race to the Top criteria was in the data systems to support instruction. The value-added longitudinal data system, introduced in 1991, was important as the application required such a system and many states did not already have a system in place. In fact, the value-added system was one of two areas to receive a B grade (the state did not receive any A's) in the aforementioned Chamber of Commerce report (Institute for a Competitive Workforce, 2007).

My analysis of Tennessee's reform efforts preceding Race to the Top finds evidence of a crisis event, widespread demand for change, and the organization of policy entrepreneurs thus corroborating the pressures for change Mazzoni (1991) identified as preceding policy innovation. The pressure for education reform in Tennessee from 2007 to 2010 appears cyclical in nature—as reforms commenced, widespread public support grew from nontraditional sources, namely, the business community and nonprofit organizations, which in turn created conditions amenable to additional reform endeavors. In addition, the presence of the governor, who was committed to the issue, ensured its continual presence in the policy spotlight over several years. Both the pressure to improve and the governor's attention to public education facilitated several education reforms and led Tennessee to be considered a strong contender for the Race to the Top competition (Brill, 2011; Gates Foundation, 2009).

AVAILABLE REVENUE

In addition to environmental pressure for change, the arena model (Mazzoni, 1991) requires new revenue to enhance the likelihood of policy innovation. Race to the Top, with its promise of money to winners in difficult financial times, was an attractive incentive. Although the policy

initiatives outlined by Race to the Top promoted ideas many states were interested in pursuing, the opportunity to win money cannot be underestimated. A former deputy to the governor with a long career in government gave his assessment about how the money mattered:

I will tell you this, others will tell you, that the reforms that we undertook around First to the Top were things that needed to be done, that would have been done irrespective of the money, that would have been proposed irrespective of the money. Truth is, it would not have happened but for the promise, the opportunity, to achieve some serious financial assistance through Race to the Top. Now if we're truthful, it would have been proposed over time; I think all of these things would have happened but it would have been a decade.

Other study participants also commented on the effect the promise of money seemed to have. For one Senate Republican, the competition "was really a vehicle for there to be some wind in our sail financially in a really tight budget time." Dismissing the notion that the money was the only reason for Tennessee's interest, she continued, "It was just good timing for Tennessee to get an investment in what was already building to be a comprehensive plan." Like the former deputy governor who believed the policy changes would have occurred eventually, this legislator viewed Race to the Top as the catalyst the state needed to continue its efforts.

Another senator offered a different perspective. He expressed bemused bewilderment as he talked about states' decisions to change policy in order to chase "this money, which, let's face it, is chump change." Although he acknowledged that Tennessee's \$485 million award was a significant amount of money, when he considered the share his county would receive over a period of several years, it was only a small fraction of the county's entire education budget. But, nonetheless, he believed it was the money that prompted the governor to take on these issues because, he said,

the governor was absolutely convinced that number one we were going to get some serious dough, and number two was that we weren't going to get anything unless we changed things. So he decided that was what we were going to do.

According to my study participants, Tennessee decided to enter the Race because it allowed the state to continue its reform efforts. However, they also acknowledged the importance of the money. Thus, although Fowler (1994) does not find evidence that additional revenue is necessary to provoke policy innovation in her application of the arena model (Mazzoni, 1991); this study finds support for this condition of Mazzoni's model.

PRESSURE OR OPPORTUNITY?

Mazzoni (1991) identified several environmental stimuli that provoke policy innovation by concentrating on pressure at the state level. In her critique of the arena model, Fowler (1994) called for an expanded conceptualization of the environment to include national level policymakers as a source of pressure. Although Race to the Top was advanced by the federal government, interviews with Tennessee policymakers (both elected official and nonelected civil servants) do not substantiate the idea that the state was responding to pressure when it decided to enter the Race. In this next section, I draw from Manna's (2006) theory of borrowing strength to propose

a third potential precursor to policy innovation: the opportunity to leverage license from other levels of government.

LEVERAGE AT THE FEDERAL LEVEL

Although Tennessee was considered a strong contender for Race to the Top (Brill, 2011; Gates Foundation, 2009), the state still needed to address several criteria, namely, evaluating teachers and principals based on performance and turning around consistently failing schools. Governor Bredesen and his staff decided to address these issues in a special legislative session with a bill that became known as First to the Top. None of the participants in this study gave any indication that Race to the Top represented a revolutionary shift in education reform. Instead, it seemed to provide the leverage the state needed for policy innovation that was the next logical step in Governor Bredesen's efforts to reform education. To build support for this plan, Governor Bredesen looked to the federal government for the license he needed in two key areas.

In discussing the governor's concern for failing schools, a former policy advisor did not believe the governor

felt like a single solution was having the state take over and run schools, but yet, he looked for some way to create more teeth in the laws and looked for more ways the state could intervene or force some intervention or change in the lowest performing schools.

Race to the Top stipulated that a plan be developed for direct state intervention in the "persistently lowest achieving schools." This offered the state the necessary leverage to warrant its intrusion into local control.

Most important, Bredesen was also able to draw strength from the competition for his proposals regarding educator evaluations. Secretary Duncan's assertion that states that prohibited the use of student data for teacher evaluation were ineligible to apply, coupled with the high-point value assigned for developing such systems, provided a strong rationale for pursuing an ambitious plan. The present statute prevented value-added data from being used until after a teacher's 3rd year, by which point tenure decisions had already been made. To be competitive, Tennessee would need to make changes to existing policy.

Local License

A local initiative also provided some leverage for the proposed legislation. A Bredesen policy advisor talked about how the Gates Foundation grant awarded to Memphis for developing a teacher effectiveness program helped the governor's push to unlock the data. He believed it "eased some political tension through the process," because

you had this Democratic stronghold of state politics down there (in Memphis) that ordinarily would be prone to kind of follow the union wherever the union told them to go. But they had already had this very open conversation in their community about teacher effectiveness and it was a very positive situation happening down there.

Unexpectedly, a reform effort in one urban district provided a source of strength for a statewide initiative. Tennessee policymakers were able to leverage their plans for the state by looking to both the federal and local levels for support.

This notion of borrowing strength to build the state's capacity was noted by a former senator and member of the Republican leadership team. She described the federal government's approach as "very out of the box" and "really wise, because states were able to build on their own conversations that they were having and develop their own pretty rigorous plans for moving forward." Her explanation lends further support to the idea that federal competition presented Tennessee with the opportunity to continue education reform efforts already under way rather than mandate conformity.

DISCUSSION

Two decades of intermittent education policy innovation left the Volunteer State lagging behind other states, according to a report from the Institute for a Competitive Workforce (2007). Governor Bredesen confronted Tennessee's tribulations with a multifaceted approach. First, he joined forces with a national reform organization to increase Tennessee's high school graduation rate; then persuaded the State Board of Education to adopt new curriculum standards by holding meetings across the state that addressed the business community's concerns regarding Tennessee's schools, next he advanced legislation to increase the cap on charter schools, and Bredesen finally reached out to traditional and nontraditional stakeholders. The end result of this persistent attention to education was a statewide perspective that education reform was both imperative and incomplete.

Thus, the Race to the Top competition did not propel education reform onto the policy agenda in Tennessee but rather provided an additional stimulus to further the state's own pre-Race efforts. Tennessee was well positioned to succeed in the competition because of its recent reform-mindedness, yet it lacked policies in three crucial areas: teacher evaluations; intervention in failing schools; and science, technology, engineering and math priorities. Among these, removing the statutes that restricted the use of Tennessee's longitudinal value-added data was the linchpin for the state's application. Compelled by a combination of factors including a proactive and popular governor who brought prolonged attention to education, the introduction of new revenue, and the opportunity to leverage license for innovation from other levels of government, Tennessee entered the Race.

Mazzoni's conceptualization of environmental factors that provoke policy change include pressures and additional revenue. Like Mazzoni's findings in Minnesota, the events in Tennessee suggest the presence of a crisis event that focused attention on education policy. This focus was then enhanced by the efforts of a political elite, namely, the governor. Whereas Fowler (1994) did not find evidence that additional revenues are necessary precursors to innovation as the arena model suggests, my results indicate that Race to the Top's promise of money was important, particularly given the financial problems Tennessee was facing.

The arena model assumes that pressure is primarily located within the state (Mazzoni, 1991), but Fowler (1994) argued for an expansion of this definition to include national pressure. This study suggests another explanation. Drawing from Manna's (2006) theory of borrowing strength, external influence for policy change can take the form of opportunity rather than just pressure. Governor Bredesen was able to use the Race to the Top competition, and specifically its parameters

regarding teacher evaluations, to advance an ambitious and controversial plan. In addition to leveraging license from Race to the Top competition, he was also able to borrow strength from the local level by pointing to the efforts under way in Memphis to improve teacher effectiveness. This implies a more interdependent dynamic between the state and other levels of government than Mazzone (1991) allowed. From this perspective, state policymaking does not simply respond to pressure but benefits from expanded license at other levels.

Implications and Future Research

The state's role in education policymaking is unique: It serves as a balance between broad federal goals and the needs of specific local contexts. This study offers an expanded conceptualization of factors in the policy environment that facilitate policy innovation and demonstrate how policy making at the state level is affected by federal and local input. In particular, it highlights the role of a proactive governor in maintaining a protracted focus on education. Further, the results from this study suggest a more interdependent dynamic between the different levels of government, as shown by Tennessee leveraging strength for its reforms from both the federal and local levels. In this way, states are not merely reacting to federal mandates but are assuming a more dynamic role. Given the high participation rate in Race to the Top (just four states did not apply), a renewed focus on state policy making is necessary to better understand how the education policy context is changing.

Future research should consider the policy environment in other states at the time Race to the Top was announced. Such studies could help our understanding of why some states were successful and others were not. Scholarship in this area could also examine similarities and differences between the states' approaches to Race to the Top criteria. It could also explore differences between states like Tennessee that were successful in passing innovative legislation, and states where reforms initially failed. It is hoped that results from this study will illuminate the evolving role of the state in education reform.

AUTHOR BIO

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Looking North of the 49th Parallel: P-12 Education in Canada

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Finland has, as of late, become an inspiration for American school reform. There is no denying that we have much to learn from the Finnish system and it rightly deserves its global accolades. However, over the course of the following pages, I would like to suggest that it is also lucrative to look north of the 49th parallel and consider the practices at work in Canada. Finland has a number of advantages that America lacks, and conditions in Canada are far closer to the challenges faced by American educators. Despite these certain disadvantages, Canada has nevertheless consistently scored near the top of the Organisation for Economic Co-operation and Development's Programme for International Student Assessment tests and comes extremely close to achieving educational equality. Perhaps even most astonishing is the fact that these results have also been achieved by provinces acting on their own, free from the direct intervention of the federal government based in Ottawa. I argue that the roots of these successes lie in the configuration and organization of schooling practices across the country that, when combined with the *indirect* support of the federal government, have enabled the creation of a pan-Canadian system of elementary and secondary education.

INTRODUCTION

Finland has, as of late, become an inspiration for American school reform. As Mark Phillips (2011), professor of secondary education at San Francisco State University, boldly declared in a blog post for the *Washington Post*, "Finland is dominating my educational radar screen." Diane Ravitch (2012) recently summarized the four reasons why this tiny Northern European country has gained such positive notoriety across virtually all of the American education community. First and foremost, according to the Organisation for Economic Co-operation and Development (OECD), Finland has one of the highest performing schooling systems in the world—a fact that Finland's education minister, Henna Virkkunen, frequently promotes to her global counterparts (Burrige, 2010). Second, Finland eschews all the educational initiatives that are au courant in today's American education circles, including requirements of longer hours in the classroom, high-stakes testing for students and teachers, merit pay, interschool competition, and charter schools. As a result, Finland is an "alternate universe" to the one familiar to American educators. Third, Finnish schools have some of the least internal variation in between-school quality among

OECD countries, meaning that they have largely achieved the American ideal of equality of educational opportunity for all citizens. Finally, Finnish education rests upon the ideas of American philosopher John Dewey, who encouraged educators to move away from the traditional model of rote learning and instead embrace individualized instruction, cooperative learning, and expanding educational opportunities for all.

There is no denying that we have much to learn from the Finnish system, and it rightly deserves its global accolades. However, over the course of the following pages, I would like to suggest that it is also lucrative to look north of the 49th parallel and consider the practices at work in Canada. Borrowing Ravitch's four-part criteria, four justifications underpin this suggestion. First, regarding performance, Canada has consistently scored near the top of the OECD's Programme for International Student Assessment (PISA) tests. What is more, certain provinces, such as Alberta, British Columbia, and Quebec, have achieved exceptionally high results that at times hit close to Finland's mark. These scores signal that the Canadian provincial systems have many education-related strengths. Second, although looking to an "alternate universe" can bring fruitful inspiration, Finland also has a number of geographic and demographic advantages that have afforded decision makers considerable flexibility as they have crafted their schooling system. Unfortunately, these are not advantages that America shares. Conditions in Canada, however, are far closer to the realities—and indeed challenges—faced by American educators. Third, on equity measures, Canada has scored slightly higher than Finland, meaning that it is even closer to realizing the American dream of equality of educational opportunity. These results have been achieved despite the fact that Canada is a geographically massive country, beset with considerable diversity, and features one of the largest immigrant populations in the world. Perhaps even most astonishing is the fact that these results have also been achieved by provinces acting on their own, free from the direct intervention of the federal government based in Ottawa. Finally, Canadian education has also drawn considerable inspiration from the works of John Dewey and—although admittedly not replicating these ideas as closely as Finland—schools across the country are modeled according to many of the principles of progressive education.

While advancing the merits of Canadian elementary and secondary education, it is important to note that I am not reifying it. Provincial education systems are not free from shortcomings, defects, or blemishes.¹ Outside of Quebec, for example, Francophone students tend to underperform relative to their Anglophone counterparts (Canadian Council on Learning, 2009). Across many cities, certain groups of visible minorities and immigrant populations fail to graduate high school at alarming rates (Reitz & Banerjee, 2007). Educators from coast to coast are also beginning to acknowledge the growing gender gap, as female students are now consistently outperforming male students on virtually every education measure (Canadian Council on Learning, 2011). All of these problems mar the successes of Canada's education system—and all are problems that policymakers must address.

Despite these failings, the overwhelming majority of Canadians nevertheless have access to a remarkably successful system of elementary and secondary education. I argue that the roots of these successes lie in the configuration and organization of schooling practices across the country that, when combined with the *indirect* support of the federal government, have enabled

¹Most distressing is the fact that Aboriginal Canadians who live on small reserves scattered across the country lag woefully behind non-Aboriginal Canadians. However, education for Aboriginal peoples living on reserves is provided by the federal government and therefore falls outside the parameters of this article.

the creation of a pan-Canadian system of elementary and secondary education. This article outlines the elements of the Canadian education system that have contributed to these successes. To accomplish this goal, I open with a brief snapshot of the current educational achievements recorded across the country before discussing the broad features that characterize the Canadian educational landscape. I then probe into the prevailing practices across the primary areas of Canadian education policy: administration, finance, curriculum, assessment, and the teaching profession. This article concludes by discussing the interactive effects of policy choices across these five dimensions, identifying the key benefits and trade-offs that they carry as together they constitute the bedrock of P-12 education systems worldwide. In a nutshell, each province has constructed a fairly centralized system of elementary and secondary schooling that is supported by stable and robust funding, provides consistent curricular content, is assessed through regular evaluations, and features instruction delivered by highly trained and certified teachers. Combined together, these 10 separate provincial systems constitute what has evolved into a “Canadian” system of elementary and secondary education.

CANADIAN EDUCATIONAL ACHIEVEMENTS

There are a number of metrics that we can use to assess the achievements of the Canadian educational system. Starting at the national level, using the OECD’s PISA, we can consider Canada’s performance relative to the other countries that participate in the assessment while also comparing high school graduation rates. To be sure, these are both somewhat crude and blunt measures, but they are the ones most readily cited as evidence of performance. Given the fact that Canada is a federal country with the responsibility for education falling to its provinces, it is also important for us to gauge the degree to which achievements are similarly recorded from coast to coast. Fortunately, Canada provides the largest sample of students for PISA testing so that results can be compared across the provinces and researchers can thus produce measures of internal equity.

According to the results of the most recent round of the PISA test, which was conducted in 2009, Canada achieved a mean score of 524 on the combined reading scale. This score is considerably above the OECD average of 496 (Statistics Canada, 2010, p. 15). In the combined reading category, only four jurisdictions, Shanghai–China, Korea, Finland, and Hong Kong–China, performed significantly better than Canada, whereas Singapore, New Zealand, and Japan recorded similar results. Canadian students have also performed well in the previous iterations of the test. In 2003, for example, on the combined mathematics scale, only Hong Kong–China and Finland outperformed Canada, whereas Korea, the Netherlands, Liechtenstein, Japan, Belgium, Macao–China, and Switzerland achieved similar results (Statistics Canada, 2004, p. 15). Secondary school completion rates are also appreciably higher in Canada, with Canada ranked fourth among OECD countries (OECD, 2007). We can even consider achievements at the tertiary level where, according to 2004 data, Canada was ranked first among OECD countries with 45% of the population aged 25 to 64 holding some form of postsecondary degree, compared with the OECD average of 25% (OECD, 2007). At the national level, Canadian educational outcomes are therefore quite high.

Looking within the country, there exist some internal disparities in the various measures of educational achievement. High school completion rates, for example, vary from a low of 66%

in the province of Alberta to a high of 86% in the province of New Brunswick. The lower completion rates in Alberta, however, are not indicative of a weaker education system. Rather, research confirms that during times of sustained economic prosperity, as has been the case in Alberta, students tend to prematurely end their studies to enter the workforce. On the other hand, when an economy is depressed (as has been the case in New Brunswick), students stay in school, thereby delaying their entry into the workforce (Rees & Mocan, 1997). The apparent discrepancies in provincial graduation rates thus replicate these well-documented patterns and do not necessarily reflect the quality of education provided in these jurisdictions.

This leads us to the results recorded by the provinces on the PISA tests themselves. In all the rounds of the PISA testing, Alberta consistently received the highest results, whereas the provinces of New Brunswick and Prince Edward Island tended to lag behind. Comparing Canada's internal results with other countries that release substate data allows us to appreciate the degree of internal parity that is recorded by the respective countries. Using the results from 2006, for example, Canada markedly outperformed countries such as Italy, Australia, and Belgium, while achieving similar internal parity as Germany (Wallner, 2010, p. 657). These findings demonstrate that in addition to Canada's high overall performance, internal variations in achievements are no greater than, and in some cases are often appreciably less than, in other countries, signaling that the provinces have fashioned effective P-12 educational systems.

The OECD has developed a measure of internal educational equality that ranks countries according to a scale that considers the impact locational variables have on educational outcomes. According to this system, referred to as "between-school variation," variance in Canada is around one tenth of the OECD average. Simply put, students' performance is largely unrelated to the location of the schools in which they are enrolled. These findings led the OECD (2007) to issue the following declaration in the 2006 report: "Parents in [Canada] can be less concerned about schools choice in order to enhance their children's performance, and can be confident of high and consistent performance standards across schools in the entire education system" (p. 77).

THE CANADIAN LANDSCAPE

After Russia, Canada is geographically the second largest country in the world. With an approximate population of 34 million people, however, it ranks just 36th in terms of population. What is more, despite the fact that approximately 90% of the population is concentrated close to the American border, Canada has one of the lowest population densities in the world with only 3.5 persons per square kilometer. Similar to the United States, Canada's population is highly diverse, as more than 13 million immigrants have built new lives in the country over the past 100 years (Statistics Canada, 2007). During the first half of the 20th century, most of these immigrants arrived from Europe, but, by the 1970s, at least half of all immigrants were coming from the Caribbean, Asia, and South America. Throughout the 1980s, a growing number of immigrants arriving from Africa further amplified this diversity. Put together, Canadian diversity presents a formidable set of challenges for those that design and deliver public services as they try to meet the needs of diverse citizens that are thinly spread from coast to coast. Like the United States, Canada is also a federation with powers and responsibilities constitutionally divided between the central government, which is based in Ottawa, and the 10 provincial governments that stretch

from the Pacific to the Atlantic coasts.² The responsibility for education also falls to the provinces, with no formal role extended to the central government.

Although the two neighboring countries are similar in many respects, Canada has three key features that considerably distinguish it from the United States—its multinational polity, alternative political institutions, and different financial arrangements between the federal and provincial governments. Each of these elements has shaped the organization and character of schooling in the country. Our discussion of these pertinent differences between the two countries begins with the formal recognition of linguistic diversity and the multinational character of the population.

With its Anglophone and Francophone populations, Canada is officially a bilingual country with a multinational polity that is territorially encapsulated by provincial borders. English is the dominant language in the majority of the provinces, whereas more than 80% of the French-speaking population lives in Quebec. What is more, at least 80% of Quebec's population speaks French, meaning that French is the dominant language of that province. Official bilingualism has had a direct impact on elementary and secondary education, where, since 1982, under the terms of Section 23 of the Charter of Rights and Freedoms, minority language educational rights are guaranteed to French-speaking communities outside of Quebec and to English-speaking minorities in Quebec. Among other things, this means that a certain degree of diversity and competition in provincial education systems is constitutionally entrenched in Canada.

Canada's demographic makeup has also had a considerable *indirect* effect on the shape and character of education in the country. Throughout Canada's history, Quebec's presence has reinforced the stature and status of the provincial governments as independent and autonomous actors capable of resisting federal interventions into areas of provincial jurisdiction (Erk, 2006). As such, Canada's bifurcated polity has contributed to its evolution into one of the most decentralized federations. In fact, given that the Canadian provinces exercise almost complete legal, administrative, and financial responsibility for elementary and secondary schooling in the country, Canadian education is regarded by many as one of the most decentralized policy sectors in the world (Meuret, 1995). Under the terms of the Constitution Act, 1867, Sections 92 and 93 allocate the responsibility for education to the provinces, subject to certain restrictions.³ Since the country's birth, the federal government has never maintained an authoritative national department capable of imposing overarching standards in the field.

This Canadian abnormality is often a cause for remark on the international stage. "When I travel abroad," declared one former Director General of the Council for Ministers of Education, Canada, "international leaders are frequently flabbergasted by the institutional framework of Canadian education. In Russia, for example, educational officials were shocked when I told them that there are 18 ministers responsible for elementary, secondary, and tertiary education in Canada. And they are even more shocked when I tell them that Ottawa is not involved"

²There are also three territories that encompass the northern part of the country. The powers of these territories, however, are not entrenched in the constitution and, until fairly recently, Ottawa appointed governors to oversee their administration. Consequently, although of increasing significance in recent years, I have excluded them from this article.

³Constitutional guarantees were extended to religious minorities (Protestant and Roman Catholic) that had already been operating schools in certain colonies, further reinforcing degree of diversity and competition in the Canadian educational landscape that Ottawa was tasked with defending. Certain classes of people are also excluded from provincial jurisdiction as Ottawa was entrusted with providing education for Aboriginal Peoples who live on reserves and for children of military personnel who live on bases across the country.

(personal communication, December 20, 2007). Where Washington has increasingly managed to stake a claim in the educational affairs of the states since the 1960s, Ottawa remains entirely shut out of the arena (Manna, 2006; McGuinn, 2006; Wallner, 2012, p. 851). Part of the reason why the federal government has been unable to intervene in education is a consequence of the multinational makeup of the country. Simply put, Ottawa lacks the necessary legitimacy to speak on behalf of the country as a whole.

The second feature that distinguishes Canada is its system of parliamentary government, which stands in marked contrast to the Madisonian tradition of checks and balances that prevails in the United States (Radin & Boase, 2000; Wallner, 2012). The president of the United States and the various governors of the individual states can choose from whomever he or she wants to fill cabinet positions and their subsequent authority to govern does not rely on the approval of the elected members of the respective legislatures. Under the rules of parliamentary government, however, neither of these characteristics exists. In a parliamentary system, like that of Canada's, the members of the political executive—known as the cabinet—are primarily drawn from among the elected members of the legislature. What is more, the authority of that executive to govern depends on the support or “confidence” of the elected members of that legislature, as expressed through voting in favor of key pieces of legislation.

These tenets of parliamentarianism, imported from Britain by both the federal and provincial governments, have inculcated a strong centralizing logic, empowering the political executives who are supported by a professional civil service that is capable of dominating particular policy fields. The parliamentary system, moreover, encourages specific configurations of authority for the oversight of government activity (Smiley, 1987, p. 59). Of particular importance here is a seemingly innocuous rule: Only active cabinet ministers are allowed to respond to questions in the legislature and clarify the government's position on an issue, answer for government's actions (or inactions) in a given area, or take responsibility for decisions that are made. This means that for every major area of government activity, like education, a cabinet position must be designated to ensure that someone from the political executive has a voice in the public forum.

Although all the provinces have the independent autonomy to design and manage education systems, the rule has motivated all 10 provinces to create parallel positions of ministers of education from coast to coast (Wallner, 2012). Influential departments that are staffed by permanent public servants support each minister of education as he or she oversees the respective elementary and secondary education systems. Where interstate differences in the American educational governance structure begin at the peak of the hierarchy, all 10 provinces have a comparable authority that heads each of the schooling system.

Among its many effects, the parallel positions in each of the provinces regularizes the interactions among them, somewhat standardizing rules of procedure and easing coordination costs among the separate systems. This is neatly illustrated by an organization known as the Council of Ministers of Education Canada (CMEC). The CMEC is an intergovernmental body created by the provinces in 1967 to facilitate interactions and collective initiatives among the education ministers and bureaucratic officials from across the country. Provincial independence is guarded by the Council as agreements reached are achieved voluntarily and initiatives are nonbinding, meaning that the CMEC has no authority to unilaterally enforce practices that are advanced by certain members. Nevertheless, under the auspices of the Council, a number of important projects have been advanced, including a pan-Canadian assessment program, curricular standards in science, and a protocol on teacher credential recognition to foster interprovincial mobility. Perhaps

more important, the CMEC provides a permanent venue for educational authorities to regularly meet and exchange their ideas on best practices and inform one another of developments in each of the provincial systems.

The third and arguably most important distinguishing feature of the Canadian landscape is the financial arrangements between the federal and provincial governments, known as the fiscal architecture of the federation. Without getting too caught up in the details, the Canadian federal government oversees a vast array of largely unconditional transfer programs that shift monies to the provinces, privileging the principle of provincial autonomy over accountability to the federal government. These transfers are designed to redistribute wealth across the country and ensure that the provinces have the necessary fiscal capacity to discharge their constitutional responsibilities without resorting to taxing their citizens at markedly higher rates. In the United States, however, the fiscal architecture is made up almost entirely by exclusively conditional grants whereby federal transfers have considerable strings attached (Watts, 2008). Washington earmarks its funds for specific programs in an effort to influence how the states allocate the monies reversing the model in Canada, privileging state accountability to the federal government over autonomy.

Ironically, with its less restrictive conditionality, the Canadian fiscal arrangements have increased the provinces' capacity to spend on programs of their own choosing and design, whereas states are often forced to make cuts enabling some jurisdictions to race ahead as others are left to languish behind (Rom, 2006; Th  ret, 1999; Wallner, 2010). Educational investments provide an illustration of this potential effect, revealing the variation between the per-pupil spending of the provinces to be markedly smaller than the per-pupil spending of the states (Rom, 2006; Wallner, 2010). Consequently, although impossible to conclusively demonstrate here, it is reasonable to suggest that the structure of the fiscal architecture of the Canadian federation has indirectly enabled a high degree of commensurability in provincial educational investments, translating into greater equality across the provincial education systems as a whole.

A SNAPSHOT OF CURRENT EDUCATION POLICIES

To appreciate the features and aspects of the 10 provincial education systems that when put together constitute the "Canadian" elementary and secondary schooling sector, we can break the education field into five main dimensions: administration, finance, curricula, assessments, and the teaching profession. Each dimension opens with a short discussion of some of the key debates swirling around particular policy alternatives. This discussion is designed to highlight some of the intended and unintended consequences that policy choices can have while also exposing certain cumulative effects that can carry dramatic implications for the configuration and effectiveness of the schooling system as a whole.

Administration

Educational administration involves the policies that construct the managerial parameters and organizational attributes of the sector, from central authorities that oversee the entire system to the management of individual schools at the local level. In general, four models of education administration exist, with each featuring varying degrees of scope and power allocated to different

administrative units. The first model features the complete centralization of power in the hands of the central state, whereby all decision-making authority remains at the national level. A second option sees the allocation of this responsibility to the substate level—like provinces or states—that may then work in conjunction with central authorities or exercise this authority on their own. In Australia, for example, the authority over education is divided between Canberra and the States, whereas in Canada the provinces are exclusively in charge of P-12 education. Below the substate level, moreover, a third model sees regional educational authorities known as school boards or local districts that provide a third administrative layer acting as a bridge between individual schools and the central authority, be that the national or provincial governments. Last, individual schools themselves can act as an administrative unit as the direct deliverers of education. In recent years, some countries such as New Zealand have opted to eliminate school boards and increase the responsibilities for individual schools, thus dividing educational administration between the central government based in Wellington and the local schools removing the middle man.

In Canada, all 10 provinces employ a common model of educational administration that revolves around strong authority vested in the hands of an individual minister of education, who heads a department devoted almost exclusively to educational affairs. Administrative powers are in turn parceled out by the provinces to local school boards (or divisions) comprised of elected (or provincially appointed) trustees advised by provincially appointed superintendents. Since the 1980s, all of the provinces have opted to somewhat expand the role of local schools, mandating the creation of individual school councils made up of parents, teachers, staff, community representatives, and occasionally students. These councils are often tasked with advising the principal on educational matters, consulting on standards set by the Minister, developing a process for school-based decision making, and providing a formal line of communication between the school and the wider community. Although seemingly formidable on paper, it must be said that these councils have failed to engender meaningful local empowerment, as the bulk of authority remains firmly in the hands of the respective provincial ministers of education. Perhaps most striking is the fact that boards play an extremely limited role in the development of curricula and the selection of instructional material. Instead, the provinces exercise this responsibility, either individually or in concert with others, rather than fragmenting this task to local administrators. This common three-tiered framework is displayed in Figure 1.

Finance

Education finance draws our attention to the “acquisition, allocation, and arrangements of funds to support formal educational institutions and programs” (Lawton, 1996, p. 1). In general, there are four types of fiscal arrangements that can be used to finance schooling systems. These arrangements range from minimal to maximum state intervention: private financing, local revenues, shared cost, and full-state funding. To start, the costs of schooling could be left entirely to the individual and his or her family. This would require either students or families to pay for programs delivered exclusively by private organizations with minimal state involvement (Friedmann, 1967). The state could make minimal subsidies available for impoverished families, but the overwhelming majority of educational costs would be borne by individuals. A second option sees the central state allocating some taxation powers to local authorities. These authorities would then use these powers to generate revenues that would cover educational costs, thus initiating a rudimentary

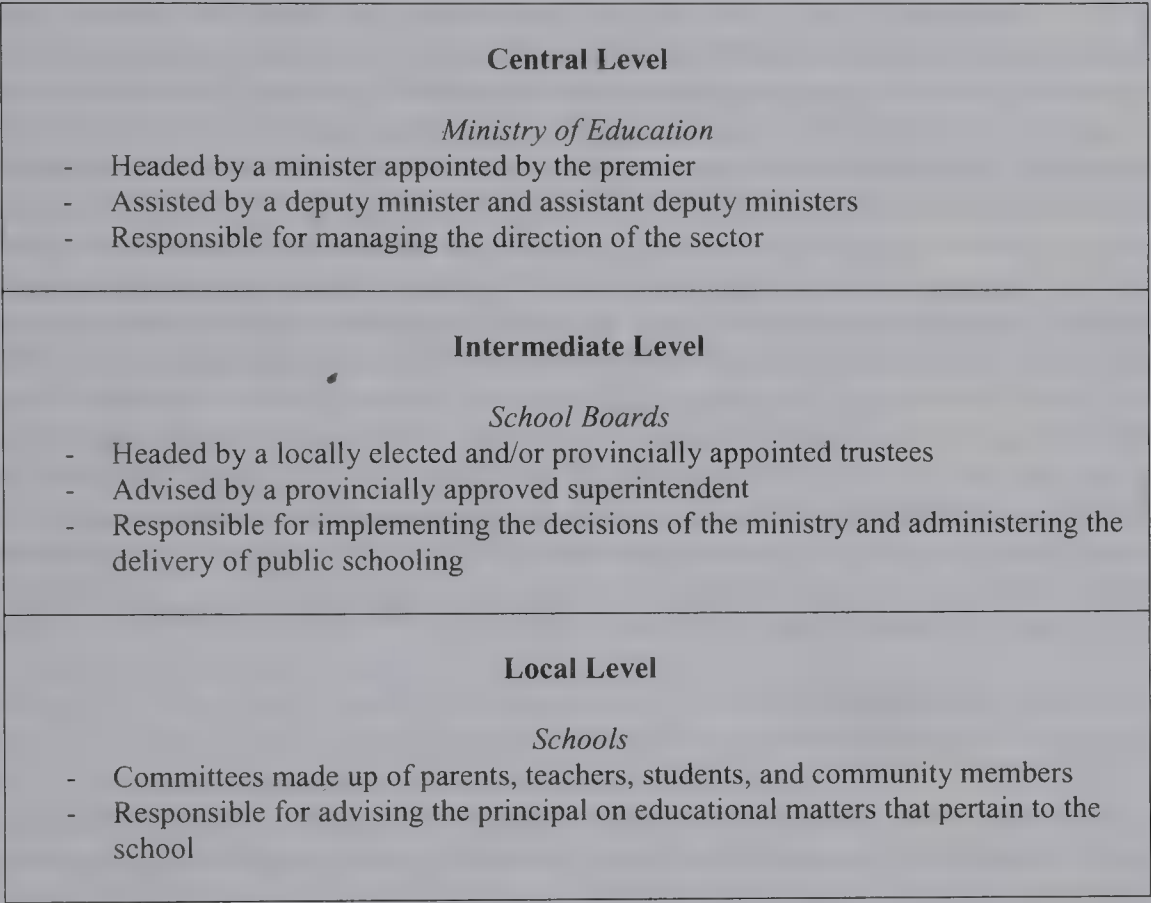


FIGURE 1 Educational administration in Canada, 2012.

system of public education. Under the terms of this arrangement, the state gains some leverage over policy choices, but this power translates into a minimum degree of influence, as local leaders are still responsible for generating the necessary revenues to finance educational initiatives.

Expanding upon this second model, the third arrangement calls for a combination of local and central financing, instituting a shared-cost framework. Local authorities would still generate revenues from taxes and would use these revenues to provide the basic funding for schools that fall under their authority. The central state would then provide supplemental funds in the form of grants. This arrangement recognizes the fact that for many districts, the local tax base may be insufficient to generate enough revenue to cover the complete costs of schooling. What is more, the shared-cost system affords the central state greater influence over the policies and practices of the local level as greater conditions can be attached in exchange for central funds.

The final model, referred to as full-state funding, sees the complete centralization of education finance whereby the state covers all the educational costs, regardless of the administrative arrangements that are in place. Full-state funding establishes maximum state intervention and severely contracts the autonomy that can be enjoyed by all the other administrative units that may be involved in the delivery of public schooling. Which of these four models is the preferred choice of the Canadian provinces?

Eight provinces have formally instituted the full-state funding model, ushering in a trend of extensive fiscal centralization that has subsequently curbed both the autonomy and capacity of local school boards and transferring that influence to the central ministries of education. However, it should be acknowledged that even before full-state funding, all of the provinces deployed a well-endowed shared-cost model, exchanging guaranteed funds to ensure a considerable degree of oversight of the actions of local school boards. Furthermore, whereas two provinces—Manitoba and Saskatchewan—are still officially using a shared-cost model with local districts empowered to set and collect their own property taxes, these two provinces have also centralized education finance. In these two provinces, locally raised revenues constitute less than 20% of the operating expenditures for schools and boards, and both provinces provide the remaining funds. What is more, internal equalization grants help guarantee that all communities enjoy relatively equal funding levels, regardless of any variations in regional economic strength. Finally, Manitoba and Saskatchewan also provide categorical grants that support specific programs such as transportation, special education, and French immersion. Put together, these attributes translate into a considerable degree of fiscal centralization across all 10 provincial education systems. This centralization fosters a high degree of security and stability of funding for schools that are scattered throughout the provincial territories.

Curriculum

Curriculum is the set of courses establishing the body of knowledge that authorities require students to learn throughout their tenure in the education system. To quote Joseph Katz (1961), curriculum is “a body of thought and activity intended to develop in children those skills and abilities deemed necessary for growth to youth and adulthood” (p. 115). A holistic discussion of curriculum would therefore encompass both the formal elements and informal practices beyond the classroom. However, due to space constraints, this discussion is limited to the formal aspects of the materials provided in class.

Different philosophical and pedagogical outlooks inform the configuration of curriculum. Under the tenets of a traditional approach to learning, for example, courses are separated into silos with mandatory textbooks and instructional activities prescribed to teachers. Students are seen to possess inherent capabilities and limitations that can be identified early in their educational career. Depending on these identified capabilities, students are then streamed into programs that are largely isolated from one another with little chance to move from one trajectory to another. Under this regime, formal education tends to be regarded as a preparation for university whereas a dedicated stream for vocational training is offered to those not bound for university.

An alternative model, emerging at the turn of the 20th century that rests on the principles of progressive education, argues, “In schools where only the three Rs are taught, the child-mind starves” (Tomkins, 2008, p. 132). The central prescriptions of progressive education involve refocusing efforts away from rigid courses of study toward a more flexible curriculum that recognizes the differential needs and potential of the individual child. Although taking on many forms throughout the years (Davies, 2002), a recent iteration of progressive education includes the idea of outcomes-based education. Adherents to this model call for the specification of pursuable targets and are preoccupied with determining the *ends* of a particular course or program.

Debates regarding the purpose and organization of secondary schooling generally fall under one of two models: bilateral and composite schooling (Manzer, 1994). Reflecting aspects of the first philosophical outlook, the bilateral model sees the creation of academic and vocational programs into which students are streamed at the conclusion of their elementary studies, often determined by external exams. The advantage of this system is that it can foster highly specialized programs; the disadvantage, however, is that it can replicate preexisting class divisions and reduce opportunities for students.

The alternative system, known as the composite model, allows students the opportunity to take a variety of programs. Rather than being filtered and sorted by external examinations at the end of elementary school, students, in conjunction with their parents and teachers, choose the program that is best suited to their needs and interests. This model sacrifices program specialization in exchange for greater flexibility, as students have the opportunity to move laterally between programs should they wish to adjust the direction of their schooling.

All of the Canadian provinces have adopted the outcomes-based approach for curriculum. Rather than adhering to the tenets of traditional education, the ministries of education mandate the learning outcomes expected of students at the conclusion of a particular program of study. Provincially appointed superintendents also help ensure regular oversight of board and school activities, assuring a high degree of internal standardization within each provincial system. Although some variations in the expected outcomes differentiate provincial curricula among the provinces, students from coast to coast are expected to acquire commensurate skills.⁴ Furthermore, interprovincial similarity in curricular content has been augmented in recent years, as regional collaborations have become the norm. The four provinces in Western Canada ratified the Western Canadian Protocol for Collaboration in Basic Education, which led to the articulation of common learning outcomes across a wide array of subject areas. The four provinces of Atlantic Canada ratified a similar statement on essential graduation learnings, which was then followed by foundation documents across six curricular areas that eventually evolved into the complete harmonization of elementary and secondary curriculum in the region.

Looking at the structure of secondary education, nine of the 10 of the provinces deploy the composite model for high school. The one exception can be found in the province of Quebec, which has fashioned a unique hybrid system that integrates aspects of both the composite and bilateral systems. Traditional, composite high school in Quebec ends in Grade 11, at which time students attend a *College d'enseignement general et professionnel* that is operated by the province. This fully funded program provides a bridge between P-12 and higher education, preparing students for either university or direct entry into a technical profession or the broader workforce. Even with Quebec's arrangement, the key point here is that students from across the country have an equal opportunity to participate in an open form of secondary schooling that privileges choice and flexibility over stratification and specialization.

⁴According to Saskatchewan's Grade One English Language Arts curriculum, for example, learning objectives are broken down into six components—listening, speaking, reading, writing, viewing, and representation. Students in Ontario are expected to achieve similar results, with the added component of media literacy. Consequently, although the broad philosophy is the same, provinces can still experiment to tailor programs for internally identified needs and priorities.

Evaluation

The fourth dimension of education policy can be bisected into two areas: tests (or examinations) and assessments. Since the establishment of grades and formal curriculum, tests have been a permanent feature of public schooling, acting as a means to determine whether or not individual students have acquired the necessary knowledge to advance through the various levels of education. Assessments, however, are a more recent instrument, which have become a prominent yet contested feature of most education systems worldwide. Assessments are intended to provide policymakers with information regarding student achievement that is publicly reported through an index, thus providing a gauge of the educational health of a specific system (Earl, 1995, p. 411). Whereas tests typically end with the individual, assessments demand comprehensive and systematic data collection to allow for comparisons across cohorts of students over space and time. What is more, depending on the consequences accompanying the results, tests and assessments can have varying stakes for students, teachers, schools, school boards, or other administrative units. Students, for example, can face higher stakes if the results of assessments are used to calculate their final course grades; teachers can face higher stakes if salary increases are allocated based on results; stakes will be higher for schools and school boards if results are released so parents can compare how well the institutions are doing; and, finally, stakes can be increased for higher administrative units—like states—if funding is contingent on strong results.

All of the Canadian provinces, save for Prince Edward Island, which is the smallest in the country, have some form of high school graduation exams, although these exams vary considerably in terms of scope and importance. For students in Alberta, for example, 50% of their marks in the final year of high school come from provincially set exams. British Columbia, in the meantime, derives 40% of its students' final marks in Grades 10, 11, and 12 from results on provincial exams. However, New Brunswick and Ontario only have mandatory literacy assessments that all students must pass in either Grade 9 or 10, respectively, to graduate from high school. None of the provinces, however, attach any merit pay for teachers depending on results or issue performance-based funding for schools or school boards based on student success.

All of the provinces, including Prince Edward Island, have implemented universal assessment programs to monitor the internal quality of public schooling in their respective jurisdictions. Similar to the pattern observed with tests, some provinces have chosen to increase the stakes that are associated with the results of these various assessment protocols. In Alberta, for example, results from provincial assessments in Grades 3, 6, and 9 contribute to a portion of their final grades. In the meantime, provincial assessments in other provinces—such as Ontario—do not influence individual results. It is crucial to acknowledge that unlike trends in the United States, results on Canadian assessments neither influence funding for school boards nor are used for such instruments as merit pay for individual teachers. This means that the stakes remain comparatively lower and oriented entirely toward educational aspects, rather than toward managerial incentives that administrators can use to try to improve outcomes.

Assessment regimes also transcend provincial borders. Under the auspices of the CMEC, the provinces have created a pan-Canadian assessment program that gauges the relative performance of Canadian students in every province and then compares the outcomes across the country. All of the provinces also participate in a variety of international assessment protocols, including the OECD's PISA. Results from these assessments are used entirely for diagnostic purposes to measure the general quality of education being provided by each of the provinces, furthering the exchange of information among provincial decision makers and generating comparable data

to situate the provinces both next to one another and internationally. As a result, none of these interprovincial or international assessments have high stakes attached to them for students, teachers, schools, or school boards (Wallner, in press).

The Teaching Profession

The final dimension of the Canadian education sector revolves around the arrangements of the teaching profession as a whole. These arrangements set down the rules, regulations, and qualifications that individuals must meet to gain employment in the schooling system, including initial teacher preparation and teacher certification. Initial teacher education refers to the formative training that a potential teacher receives prior to entering the classroom. Programs are generally broken into three sections: academic disciplines or subject content, pedagogy—including teaching methods and education theory, and practice teaching. The primary debate centers on which agencies should be responsible for instructing prospective teachers and what types of academic qualifications should be required.

Teacher certification involves the regulations surrounding the formal licensing of instructors by an authoritative body. A key issue at play here is the question of who should determine these regulations and control the processes of certification. Local authorities, for example, could set down the formal standards for a particular school or school board. Under such a system, the parents, community leaders, and school administrators set the standards for employment within their specific institutions. Alternatively, a central authority could streamline control and centralize the licensure process. Such a system sacrifices true local control in favor of harmonized practices throughout the entire education system.

In Canada, universities provide all the initial training and all teachers employed in the public system are required to have a university degree to gain certification. Although universities deploy a variety of programs for prospective teachers, all candidates are required to have a Bachelor of Education in conjunction with either a Bachelor of Arts or a Bachelor of Science, depending on their subsequent subject areas of specialization. The provinces then control much of the certification process, as registrars housed in the respective departments of education set the alternative definitions and scope conditions for professional accreditation. The two exceptions occur in British Columbia and Ontario. These two provinces have created separate, self-regulatory colleges of teachers, modeled after other professional associations such as legal bar associations or engineering associations. The provinces then allocate the responsibility for certifying and registering teachers to those institutions. Even within these two provinces, however, the crucial point is that the responsibility for the licensure process is held by a central organization, rather than fragmented across local units, ensuring a high degree of internal parity throughout the system.

Working conditions across the Canadian provinces display a similar level of parity. Across the country, teachers employed in the provincial public systems have reasonable salaries with starting annual pay ranging from \$36,305 to \$58,980. Teachers also enjoy sizable benefits packages that include maternity/paternity leave, sick leave, supplementary medical insurance, and retirement plans. Instructors in the public system are also members of provincial unions that are responsible for negotiating salaries and benefit packages on their behalf. These unions work to defend the interests of their members and help to instill the profession with a high degree of employment security.

DISCUSSION

Although Finland is a favored nation for American education reformers, in this article I have argued that there are attributes of the Canadian P-12 system that warrant attention. To be sure, certain features beyond the education sector of the Canadian state have expedited its educational success. First, the parliamentary system of government means that the party in power typically controls both the legislative and executive branches, meaning that the government in power can do what it wants without major opposition. Furthermore, the seemingly innocuous rule that only elected politicians can answer questions in the legislature has encouraged all the provinces to create parallel positions of a minister of education in each provincial executive. This stands in stark contrast to the diverse administrative arrangements at work across the U.S. P-12 education systems. Second, the federal government deploys redistributive grants to the provinces that are unconditional through its equalization program to help ensure that all Canadians have access to reasonably comparable programs for reasonably commensurate rates of taxation. It is up to the provinces themselves to decide where to allocate these funds according to their own defined needs and preferences. Thanks to this equalization program, the provinces maintain similar levels of investment in educational spending safeguarding comparability from coast to coast. Put together, these two features of the Canadian federation have likely contributed to the provinces' abilities to craft effective schooling systems with students recording high achievements from coast to coast. But this does not mean that there is nothing to be learned from the Canadian P-12 system.

By breaking the P-12 education sector down into its five components of administration, finance, curriculum, assessment, and the teaching profession, we can begin to appreciate the interactive effects of seemingly independent policy choices as they shape the overall character of a particular education system. Taking a close look at the provincial education systems, we find that each province has built a centralized system of elementary and secondary schooling that is supported by stable and robust funding, with consistent curricular content, where students are assessed through regular evaluations, instructed by highly trained and certified teachers who enjoy generally favorable working conditions. Together, these 10 essentially separate provincial schooling systems make up a "Pan-Canadian" system of elementary and secondary education without the direct intervention of the federal government setting standards or legislating mandates that the provinces are required to follow. How were these arrangements secured?

The provinces have established a clear leadership role in the education sector that starts at the top of the governance structure. In each province, an elected official within the political executive is tasked with heading a provincial department of education. Permanent civil servants with long-standing experience in education staff these departments of education, which—unlike in the United States—remains in place despite changes in the ruling party. Although local school boards exist, the responsibilities allocated to them by the provincial governments are quite limited and their actions are overseen by provincially appointed superintendents who act as a managerial bridge between the local school board and the province.

In addition to this centralized administrative structure, the Canadian provinces have a long tradition of providing guaranteed funds to local school boards initially under the shared-cost model of education finance and now through the arrangements of full-state funding. As a result, the provinces maintain coherent and fair funding system to support public schools. Centralized funding arrangements, moreover, afford provincial decision makers a powerful lever to encourage local school boards to use centrally developed curricula, administer mandatory assessments, and

hire provincially certified teachers. These practices mean that students have access to similar schooling programs regardless of where they live within a particular province—and in fact across the country.

There are nevertheless clear trade-offs with these arrangements. Perhaps most significantly, local control over educational decisions is almost entirely sacrificed at the hands of provincial decision makers. Such centralization at the provincial level, moreover, may stymie local innovation as schools and school boards lack the administrative and fiscal room necessary to pioneer new programs and strategies free from central oversight. Provincial decision makers must be attuned to these shortcomings and develop strategies to achieve local input to educational policymaking to ensure that rigor mortis does not set in allowing provincial education systems to continue facing their challenges and producing high-quality public schooling available to citizens from coast to coast.

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State Education Agencies' Acquisition and Use of Research Knowledge for School Improvement

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Over the last two decades, state education agencies (SEAs) have been given considerable responsibilities for improving low-performing schools and for adopting research-based practices in doing so. Yet we know little about how and where these organizations search for, select, and use research and other kinds of evidence. We examined these questions as they relate to school improvement designs and strategies in three SEAs using a combination of surveys and interviews conducted in 2010–11. We found that SEA staffs relied most heavily on their colleagues for information but that information often flowed across departments and offices, contrary to the usual image of the SEA as a segmented and siloed bureaucracy. A large number of external organizations were identified in SEA research advice networks and played a catalyzing role in the design or elaboration of research for policy. Although most sources were named by just one person, each SEA also had central internal staff who played an important role in brokering research on school improvement. Identifying and cultivating such influential actors, and connecting individuals who are now isolated or only weakly engaged in these communication networks, could create a more robust exchange of knowledge around school improvement.

Over the last two decades, grant programs or federal and state legislation, such as No Child Left Behind (NCLB), Race to the Top, and Title I School Improvement Grants, have given state education agencies (SEAs) considerably more responsibilities for directing and guiding the improvement of low-performing schools. At the same time, these policies have pressed SEAs and school districts to adopt research-based school improvement policies and practices. Title I

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or other sections of NCLB and initiatives like the What Works Clearinghouse require or in other ways incentivize SEAs to use research-based knowledge in their statewide systems of support for low-performing schools, technical assistance for districts, professional development for teachers, and school improvement programs (Barnes, Massell, & Rowan, 2007; Honig & Coburn, 2008; Massell, Barnes, Rowan, & Perrault, 2008). Policymakers have urged SEAs to engage with intermediary organizations external to their own agencies to extend their strained capacity to provide improvement supports for schools and districts and to help them collect and use research or other evidence (Redding & Walberg, 2008; Rennie Center for Education Research & Policy, 2004).

Although studies of districts' and schools' use of research exist (see, e.g., Coburn & Talbert, 2006; Farley-Ripple, 2008; Honig & Coburn, 2008), we know little about how SEAs search for, select, and use research and other kinds of evidence in their school improvement strategies. Although one might assume similarities in research use behaviors, both the organizational structures of SEAs and the population of external organizations with which they interact are quite different than schools and districts, and the most recent in-depth study of SEAs was conducted more than 17 years ago (Lusi, 1997).

The exploratory study from which this article is drawn is designed to fill that gap by examining whether and how SEA staff look for research and other types of knowledge to improve low-performing schools and how SEAs are organized to manage and use such knowledge. For this article, we focus on where SEA staff search for research related to school improvement, the types of knowledge that SEA staff seek out for their work, and how they integrate various kinds of information into their design and delivery of supports for low-performing schools.

STUDY OVERVIEW

Conceptual Framework

The conceptual framework underlying our study is drawn from several lines of research and theory, including knowledge utilization studies, organization literature, the literature on social capital and social networks, school improvement research, and policy and evaluation research. These literatures led us to focus on four major areas of potential influence in the process of knowledge search, incorporation and use: (a) the sources of knowledge; (b) the types and forms of knowledge exchanged within and between SEAs and intermediary organizations; (c) SEAs' organizing structures, including knowledge networks for managing and using knowledge; and (d) the political, contextual and institutional factors.

Sources of Knowledge

We focused on where SEA staff searched for knowledge, particularly the extent to which staff turned to internal sources within their own SEA for advice or to external intermediary organizations. Studies in other settings have shown that educators typically seek out colleagues inside their organization for advice, particularly those who are organizationally or physically closest to them (e.g., Supovitz & Weinbaum, 2008). SEAs have been portrayed as highly fragmented,

“siloes” organizations with little communication across different units and programs (see next for more details on organizational structures). Thus we also considered the extent to which individuals sought information within or beyond their own offices, across divisions, or in regional area education agencies, a level of organization above the districts and below SEAs.

Research suggests that external organizations can be key conduits for research-based knowledge and for the effective translation of research-based knowledge into local practices. A variety of external organizations focused on the business of school improvement have grown considerably over the past several decades, providing information, training, materials, and programs (Rowan, 2002). The federal government has targeted resources on helping SEAs develop a system of supports through a network of comprehensive assistance and other sponsored centers (Massell et al., 2008; Turnbull, White, Sinclair, Riley, & Pistorino, 2011). Other organizations have become involved in this enterprise, including professional membership associations, national or state-level research and provider organizations, and institutions of higher education, among others (Honig & Coburn, 2008; Rowan, 2002; Weiss, Murphy-Graham, & Birkeland, 2005). Here we consider whether and to whom SEA staff turn for information within this array of potential outside sources.

Finally, studies have shown that some sources of information or advice can be more prominent or influential than others in shaping policies or practices (e.g., Miskel & Song, 2004). We consider whether external organizations or SEA members were named by multiple respondents to determine whether they became important actors in the search for research and in its use in school improvement policies or practices.

Types of Knowledge

We define *research-based knowledge* as findings that have been to varying degrees “collated, summarized, and synthesized” and then presented in ways that provide empirical or theoretical insights or make them otherwise informative (Davies & Nutley, 2008). Older knowledge utilization models assumed that simply transmitting such knowledge to policymakers or practitioners would be sufficient to create change. But new models show that research-based knowledge is not sufficient to meet the needs of professionals using it; “potential users need direct and practical help to adapt policies and programs to their particular situations” (Petersilia, 1987, as cited in Weiss, Murphy-Graham, & Birkeland, 2005, p. 33). Integrating contextual, local, and practitioner knowledge with research knowledge is critical to developing “useable” knowledge to guide action (Cohen & Weiss, 1993; Honig & Coburn, 2008; Hood, 2002; Huberman, 1990; Lindblom, 1990; Lindblom & Cohen, 1979). Therefore, we consider SEAs use of *other evidence-based knowledge*, which we define as data, facts, and information relevant to the problem of school improvement, and *practitioner knowledge*, which is the information, beliefs, and understanding of context that practitioners acquire through experience.

Organizational Structures

Lusi (1997) argued that nonhierarchical, or less segmented, organizational structures could help build internal and external relationships among SEA actors and produce more effective, adaptive organizations. She argued that “flatter,” more lateral collaborative organizational structures provide mechanisms for exchanging information across units or even across organizational

boundaries thus bringing in more timely, varied, but relevant expertise and knowledge to bear on problems (Weick & Sutcliffe, 2001). These more lateral professional advice or knowledge networks, for example, can promote wider access to resources, more policy coherence through shared knowledge or learning, and other social capital such as mutual trust and motivation to address problems of practice (see, e.g., Brown & Duguid, 1991; Bryk & Schneider, 2002; Coleman, 1988, 1994; Frank, Zhao, & Borman, 2004; Goddard, 2001; Wenger, McDermott, & Snyder, 2002). Here we consider (a) more traditional, hierarchical work structures versus more lateral and collaborative research, practitioner, or data networks, and (b) the size or breadth of these networks in terms of different kinds of expertise or shared knowledge within them.

Political, Contextual, and Institutional Factors

Finally, policy implementation studies show the strong effects that the policy context—the mandates and incentives requiring or encouraging action in a particular sphere, and the regulations that govern action—can have on shaping or constraining knowledge search and incorporation. In addition to considering these factors, we look at whether and how the level of SEA expertise, staffing, or funding influences what research or other information is considered feasible, and useful (Massell et al., 2008).

Study Sample and Methods

We included three SEAs in our study, selected from different regions of the country and varying in size and organizational structure of the SEA, in the richness of their intermediary environments, and in their strategies for school improvement. For example, the number of SEA staff ranged from 250 to 500 across the three SEAs. Two of the SEAs had more hierarchical organizational structures, whereas the structure in the third SEA was considerably flatter, with fewer staff per unit and thus, at least formally, not as many “chains of command.” The states varied on the extent to which their accountability systems and school improvement strategies were focused primarily on schools versus school districts, on the provision of direct assistance versus more general capacity building support, and on the involvement of regional education offices in educational programming and technical assistance.

The data for this article were collected in 2010 and 2011 and include in-depth interviews with a purposive sample of high-level SEA staff involved in school improvement and related programs (accountability, special programs, teacher policy), and a web-based survey sent to all SEA school improvement staff and a representative sample of all other SEA professional staff. The analysis includes 49 interviews and more than 300 completed surveys across the three states, as well as documents describing SEA school improvement policies and tools designed for district and school use. The overall response rates for the survey were 65% in State A, 72% in State B, and 81% in State C.

Interviews explored the respondent’s professional background and roles and responsibilities; the organizational structure and staffing of the agency; the state’s strategy for improving low-performing schools and the fiscal and political context for those strategies; the sources and types of knowledge used to develop, implement, and/or revise the state’s improvement policies

TABLE 1
 "How Often Do You Use the Following to Inform Your Work?": Percentage of All SEA Respondents Answering
 "Once or Twice a Week" or "Daily or Almost Daily"

	State A	State B	State C
Research (e.g., published original research, research syntheses or summaries, meta-analyses)	35%	45%	32%
Program evaluation (e.g., published or unpublished evaluations of programs or policies)	19%	32%	20%
Research-based guidance (e.g., books, best practice guides, protocols or other tools written for practitioners)	33%	47%	35%
Data on schools in your state (e.g., student outcome data, administrative data such as the distribution of highly qualified teachers, etc.)	60%	53%	42%
Advice from colleagues within the SEA	82%	76%	70%
Advice from practitioners outside of the SEA who have knowledge of how your programs work within your state or in other states	38%	40%	31%

and programs for its lowest performing schools and school districts; and the qualities of the respondent's knowledge networks.

The survey collected information from all SEA respondents on their (a) length of service in the SEA, (b) use of different forms of knowledge in their work, and (c) organizational units inside and outside the SEA with whom the respondents interacted and from whom they sought information. Survey respondents who identified their work as related "in any way to improving low performing schools and school districts in your state" were also asked a series of questions about (a) the organizations and individuals with whom they interacted within three knowledge networks—research, other evidence/data, and practitioner—related specifically to programs and practices for low-performing schools and school districts; (b) the strength of these networks (as measured by frequency of communication and their influence on respondents' work); (c) the level of trust and collective efficacy within each of the networks; and (d) other influences on their work.¹

MAJOR FINDINGS

Types of Knowledge SEA Staff Used in Their Work

SEA staff used multiple types of information to inform their work, but staff from all three states relied most heavily on advice from their own colleagues, with 70 to 80% turning to their fellow staff members at least once or twice per week (see Table 1). This was followed by the use of data on schools in States A and B, where 60% reported using this type of information in their work. Only 40% reported doing so in State C, perhaps because they had relatively fewer employees devoted to the production or use of data reports.

¹In State A, we were unable to collect the names of individuals from whom the respondents sought advice and information in these three networks, the level of trust and collective efficacy within each of the networks, and other influences on respondents' work.

Between one third and nearly one half of the staff reported using research (such as published original research, research syntheses or summaries, meta-analyses) or research-based guidance (such as books, best practice guides, protocols, or other tools written for practitioners) in their work. Our interviews suggest that this kind of knowledge often played a catalyzing and important role in the design and delivery of services for low-performing schools and districts (see next). Staff reported using the results of program evaluations least often. The low percentages may be a result of a limited supply of program evaluations, as one state's research director noted that the cost for them to conduct such studies could be prohibitive. About 10% of respondents, on average, reported that they "never" used the different types of information in their work.

Sources for Research-Based Knowledge

Internal Sources

Across the states, a majority of survey respondents (53%–63%) agreed or strongly agreed that the best resources for information useful to their work came from *within* their agency. Even higher percentages of staff involved in the work of school improvement (74%–80%) turned internally for research on programs and practices targeted at improving low-performing schools and school districts. Staff in the two states for which we have individual names turned to a relatively large group of colleagues. The 121 school improvement staff members in State B named 98 different colleagues as a source of advice, whereas the 63 improvement staff members in State C identified 72 colleagues.

Differences in the formal organizational structures of the three SEAs make precise comparisons of communication patterns across the states difficult. For example, State A has separate divisions for school improvement and curriculum and instruction, whereas these two functions are located in the same division in State B. In State C, school improvement and assessment and accountability are located in the same unit, whereas assessment and accountability are in their own division in State B but are spread across two divisions in State A.

However, we can make inferences about the extent to which individuals seek out research related to the work of school improvement across the range of functional responsibilities and funding streams, such as special education, assessment, research, and school improvement. Using this approach, we found that the highest percentage of respondents turned to the offices directly responsible for school improvement and curriculum and instruction, and next most often to assessment and accountability (see Table 2). For example, in State A, the offices of school improvement (21%), curriculum and instruction (18%), assessment (5%), and accountability (8%) composed slightly more than half of the SEA staff that respondents turned to for research. This was a quite similar situation in States B and C, where 49% and 58% of all sources mentioned by respondents were in offices that served these similar functions.

Research activities were housed in different locations across the three states and had different levels of staffing. In State A, there was a discrete office for research, whereas in B it was located within assessment and accountability, and in C it was in the Superintendent's office. In State C, only a single person was dedicated to this work, whereas 10 individuals staffed the research office in State A. Despite these differences, these offices placed among the top four or five internal sources for research information named by school improvement staff.

TABLE 2

Highest Ranking Sources for Research Knowledge Within SEAs (by Division): Percentage of Total SEA Mentions in the Research Network

State A		State B		State C	
School Improvement (includes ESEA) programs	21%	School Improvement (includes Curriculum & Instruction)	34%	School Improvement (includes Assessment)	32%
Curriculum & Instruction	18%	Superintendent's Office (includes School Redesign, Academic Programs)	14%	Curriculum & Instruction (includes ESEA)	26%
Accountability	8%	Assessment & Accountability (includes Research)	15%		
Assessment	5%	ESEA	13%		
Research	9%			Superintendent's Office (includes Research)	6%
Special Education	7%	Special Education	6%	Special Education	17%

Note. Columns do not add to 100% because we include only office functions with the highest mentions 5% or above). SEA = state education agencies; ESEA = Elementary and Secondary Education Act.

Cross-office searches for research advice on school improvement extended to other divisions or program offices as well, most notably to special education units. These offices represented as much as 17% of all internal staff mentioned in State C and 6% to 7% in State B and State A, respectively. Their relatively prominent role may be surprising to those who have long perceived special education as the most separate unit of an SEA because of its distinct responsibilities and funding.

Our evidence indicates that although many did rely on people inside their own offices for research advice, their search extended across multiple internal offices or divisions. This cross-office communication stands in contrast to the usual image of SEAs as isolated and “siloe” units, and it is an indication that the searches were broad, and tapped a wide pool of expertise.

Cross-office communication was attributed to multiple factors, including state and federal accountability demands, competition for federal grants, reduced SEA staffing, and an intellectual argument for organizing into cross-office teams. For example, in State C, special education staffs were included in a school improvement team that convened every other month with its partners in the NCLB comprehensive assistance centers (CACs) to develop their statewide system of support for low-performing schools.² Their inclusion here and in other work across the agency was perceived to be a significant shift in agency routines. A director of one special education office commented.

Over time there might have been one or two people in the instruction office that actually wanted to collaborate with people in the special education office on some instructional endeavor as a bulk—as a mass of people, they didn't. . . . But now, it's someone representing special education has to be at the

²The CAC network set up by the Technical Assistance Act of 2002 created 16 regional assistance centers dedicated to one or more states and five specialized content centers. The content centers were supposed to identify and help regional centers and states identify and use high-quality research in particular areas, such as high school reform, improvement and innovation, and assessment. These CACs became operational in late 2005.

table. . . . I attribute it to No Child Left Behind, AYP . . . looking at accountability for that sub group. (State C: 1012)

Similarly, the federal Race to the Top program was an impetus for collaboration across the offices of State B, and was thought to have had lingering effects.

In State A, a new system of regional support set up to assist lower performing school districts drew upon the services and expertise of a range of SEA offices, including special education and English Language Learners staff. Again, this was seen as a change in organizational practices:

It does require a new way of working. And what I have found so helpful, is that the content offices and the specialty offices like special ed and ELL are finding that they've always been looking for a way to have their services spread out and used in all of the parts of the state. (State A: 0113)

Because of declines in the number of staff within agencies B and C, completing tasks presented a challenge that collaborating across work units helped them resolve. Further, they perceived that the smaller size of the organization had actually helped them get to know one another better.

I think that when we had more folks there, you were not really kind of sure who to go to. And then we got smaller, we just had to rely on us to get things done. And I think that a lot of that is attributed to [our superintendent], who . . . restructured the agency a few years ago and combined some groups. (State C: 1034)

Finally, cross-office communication was also spurred by a very intentional effort to create teams to share information or work on common tasks and problems. State A reviewed the literature on "communities of practice" to help conceptualize and design delivery systems that would convene groups on a regular basis to share and discuss problems, experiences, ways of addressing issues, and other kinds of informational resources. External partners often played a role in facilitating cross-office or even cross-agency teams. State B had held regular, formal meetings between various SEA staff and their service delivery partners for 4 years or more, a routine facilitated in part by a staff member of their regional CAC and a professional membership association. The Center on Innovation and Improvement (CII), a national CAC, hosted the Academy of Pacesetter States to convene cross-office state teams on a regular basis to discuss statewide systems of support for low-performing schools. Both States B and C were active participants in this work.

Such communications and collaborations created opportunities to exchange information and research across multiple organizational layers. One individual commented,

What helps us is the regular communication that we have and through email, through meetings, these same people come to the [area education agency meetings for low-performing schools], they also go to school improvement facilitators network, which is a PD thing for us as school improvement people. So we get professional development there, we can network there and talk there. So I think that those conversations and sharing of research . . . has really helped. (State B: 1005)

External Sources

Although SEA staff most often turned to their own colleagues for advice, 27 to 30% of all surveyed SEA respondents indicated that external groups or individuals provided the information that was most useful to their work. Similarly, between one fourth and one third of the SEA staff

involved in school improvement turned to external groups or organizations for research (24% in State A, 31% in State B, and 33% in State C).

Our interviews with SEA school improvement staff indicated that these external organizations played a more significant role in conceptualizing and developing policies and strategies than these percentages alone would suggest. The knowledge gained from these groups was used to calibrate the steps SEAs were taking in the often uncertain work of improving low-performing schools and districts. External organizations also were important when the SEAs did not have the kind of expertise, or the staff capacity, they needed. They helped translate, synthesize, and package research for policy and practice by directly providing research-based tools or resources, or by acting as partners to coconstruct and develop or even deliver a range of supports.

The SEA school improvement staff who cited an external source of research knowledge named a large number of distinct³ organizations or individuals: 35 in State A, 44 in State B, 43 in State C. These numbers indicate that the research advice networks, on the whole, brought a wide range of expertise and perspectives to bear on SEA work, a situation our framing literature suggests can lead to more adaptive, flexible, and higher capacity organizations. These organizations were located in different sectors of the environment, but government agencies or government-sponsored centers comprised the most significant share. In States B and C, professional membership associations were also a major source of research. Most of these were occupationally related membership organizations, such as the National Association of Secondary School Principals, specific subject-matter associations, or groups focused on general educational improvement, such as ASCD.

Although the states turned to some of the same organizations for research advice, each had their own constellation. These differences reflect prior partnership histories, availability of and access to state organizations, the stage and focus of SEA school improvement work, and SEA staff expertise. For instance, regional area education agencies and their respective membership association have long partnered with the SEA in State B in delivering services to schools. These regional government agencies pioneered strategies for improvement that State B later adopted as part of its statewide systems of support, such as a design for working with low-performing schools to model an improvement process. By contrast, State C did not have an equivalent set of regional government partners. Instead, they had long worked with a state-level professional membership association in school improvement design and delivery.

SEA staff turned to a different mix of organizations in the large government sector. For example, State A sought research advice most frequently from various Institute for Education Sciences-sponsored regional education labs for research advice, whereas staff in States B and C relied more heavily on the regional and content centers within the CAC network. The latter comprised about one half to two thirds of the government research sources named in States B and C, compared to only 4% in State A.

Why did a relatively larger number of staff name the CAC network in two of the states, but not the third? The answer may at least partially lie in the fact that their systems of support were more in flux in States B and C than in A. In the latter state, the basic components of the state's design for improvement supports had been in place for many years; the overarching design was not a

³By distinct sources, we mean those that were specifically identified, not general types. For example, if someone said "publications" or "institutions of higher education" we did not count that a distinct source in this calculation.

target for major review. As a result, State A was more likely to pull in external organizations on an as-needed basis, to request very discrete and specific tools and resources, whereas the other two states were considering more significant changes. State C was bracing for more and more schools to come within its purview for not meeting state accreditation standards (which contained higher graduation requirements) or federal NCLB standards, in the midst of a very spare and declining SEA workforce. They turned to their CACs to help them redesign their supports and create a research-based infrastructure of tools to monitor and assist schools in a less expensive way, to identify students at risk of not graduating, and to develop a more district-based approach to intervention.

And in 2010, State B requested help from the CACs to design a request-for-proposal to evaluate the impact of its established statewide system of support on school processes and outcomes. They also asked their regional CAC to help them facilitate meetings across delivery system partners; conduct surveys of principals in targeted schools; create a handbook describing their system of support; and engage with the CII's Academy of Pacesetter States, the National High School Center, as well as other national CACs.

Such external groups had expertise, or access to expertise, that the SEAs simply lacked. For instance, both States B and C had very limited capacity for high school improvement and guidance, due in part to staffing cuts. State C reached out to the National High School Center and a provider organization, Mass Insight, to help them develop tools to assess whether middle and high school students were at risk of dropping out. State B had struggled for many years without any expertise in that area as well, despite a gubernatorial initiative focused on high schools. State C relied heavily on its commercial vendors for psychometric expertise because it did not have in-house staff with those abilities. One director noted that working with external organizations had given them access to individuals with the kind of expertise and skills that they were not able to afford themselves.

In addition to filling these gaps, some external sources were valued as more neutral purveyors of knowledge than the SEA, an asset if targeted schools were wary of the state reform agenda. Similarly, the expertise carried by external organizations or individuals could provide an outsiders' perspective on whether state efforts were within the bounds of best practice—an important metric for state agencies and policymakers who are engaged in often uncertain work. A staff member from State C discussed turning to several outside sources to validate the steps they were taking to build a new teacher evaluation system that incorporated measures of student achievement, an effort that began with a long-time contact:

[Professor Z] was very influential when [our teacher standards document] was developed ten years ago. We know he's done work for the other regional centers across the country. He's working in China, he's an international expert. . . . We had a vision when we started, but he's helped validate that for us and tell us that it is in line with what others are doing. And by the same token, we work with ETS, the Educational Testing Service. They certainly have a research arm, and they've validated what we've done. (State C: 1008)

Another similarly commented,

I'm optimistic about this community of practice work as we are able to talk more critically— have an opportunity to talk with these other states and what they're doing and how they're going about doing it. Because if we go into the value-added work . . . what are other ramifications of that? You don't want to go blindly down one path and find it blows up in your face. (State C: 1011)

This and many other examples illustrate the point that states must often push beyond the bounds of research to respond to mandates or conceptions of “good ideas” and look to other external practitioners to help them gauge whether they are on an appropriate path of action. But these examples often needed to be from similar settings. “You can’t compare us to a state like Delaware. . . . You can fit their entire administration around my desk. They don’t have any diversity. . . . We’ve got to put it through the lens of what’s going to work in [our state]” (State C: 1008).

Finally, external organizations frequently played an important role in synthesizing and packaging research to make it useable, and useful, to SEA work. As an administrator in State A explained,

Because our work [in my office] is so huge, I’ve relied on consultants and organizations that can capture and summarize. . . research so that we can figure out, focus on how we’re going to use it to inform our work. Sometimes I get that help in the form of a piece of research or book, but that’s rarer. It’s usually a conversation and sometimes it’s a . . . model or an example or a consultant that has had experience with this work. . . . We’ve also learned a lot from companies that have strong experience and knowledge of the research like Indistar, Sam Redding’s firm, and Cambridge Education. (State A: 0109)

Singularity and Centrality in the Research Network

Although state staff involved in school improvement turned to a large number of sources inside and outside their agencies for research information, many of the connections within them were unique to individuals—that is, these sources were frequently identified by just one person. This singularity of connection was particularly true in terms of staff outreach to external individuals or organizations. Approximately one half of the external organizations were selected by a single staff member (49% in B, 55% in C, and 56% in A). Internally, 13% of the SEA staff sought out for research advice were mentioned by just one person in States B and C. Adding in those named twice accounts for one fourth to one third of the mentions in these two states.

This pattern of singular connections has several explanations. In some cases, staff turned to individuals with whom they had prior, personal experience, such as a former graduate faculty advisor or friend. One person could serve as the primary liaison between the SEA and the outside group. Some of the external organizations played a more significant role in agency work in an earlier period. Finally, communication could be quite specific to the task for which the research was pursued, and for which one SEA staff member bears responsibility.

But our survey results also indicate that a few external organizations and SEA colleagues were identified by many more respondents than others in their respective external or internal groups and were prominent or influential “nodes” in the network. For example, one outside organization represented nearly 25% of all the external organizations identified by staff in State C. A small number of staff members within the SEAs were also frequently pursued for research advice related to improvement, and thus were central players in the network. In State B, 11 staff members (11% of named sources) received nearly half of all mentions; these individuals were named between nine and 24 times each. Similarly, in State C, six employees (8% of named sources) were named

between nine and 30 times, representing more than one third of all mentions. In both states, the directors of school improvement were at the top of this list.⁴ For example, one person noted that he always turns to their director of school improvement for research because she

Is such cutting edge that she's always looking for you know, what will help individual kids in schools, individual schools. . . . She was at a conference and Sam Redding, the director of the CII, was talking. He finished talking, and she chased him down the hall and said, "This is what we need. This is what I'd like to have. (State C: 1009)

Indeed, majorities of these sources were senior administrators in their respective SEAs and were viewed as having critical knowledge or access to expertise. They also had authority and, as senior administrators, often a broader perspective on how research could be fit to the needs or circumstances of their organization.

Translating Research Knowledge into Varying State Contexts

We anticipated that the stage and design of states' school improvement strategies would impact the type of information that SEA staff found relevant and useful. We reviewed state documents and asked SEA staff to describe key elements of their school improvement strategies; how these strategies were designed, implemented, and/or revised; and the decision-making processes they used, including who was involved and the types and sources of information they turned to and why. Using these questions, we situated the search for and use of research and other kinds of knowledge in the context of problems of policy and/or practice.

The three states varied in their approach to school improvement and in their strategies for delivering services. For example, many years ago the legislature in State A required that they focus on districts as the locus of improvement, and the state has maintained that approach. Although State B also once focused on the district, several years ago they decided they would gain more traction by providing improvement supports directly to the schools not making adequate yearly progress. By contrast, State C began with a focus on the schools, but anticipating growth in the numbers not meeting state or federal accountability standards led them to shift to a district-level intervention approach. These and other distinctions produced somewhat different sets of policy and practice challenges.

Although some of the problems that SEA staff addressed were unique, many others were similar. For example, all three wrestled with how to guide schools and districts to identify and concentrate on key areas of need to make gains, balance and blend state oversight with state support, provide an appropriate level of service (intensity of support), develop leadership, use data effectively, integrate new federal School Improvement Grant requirements into their system for improvement, and more. To illustrate how these states engaged with research, we recount their common efforts to design and/or refine the overall frameworks underlying their school improvement plans and strategies.

⁴Survey respondents were asked to report on a scale how frequently they interacted with the individuals they named as a source of advice. When this measure was combined with a survey rating of influence, other individual staff members could emerge as "stronger" links in the network. We will publish those results at a future date.

State A

A set of district and school standards and indicators form the core of State A's approach to district and school accountability, planning, and assistance. These standards and indicators are designed to guide the actions taken by schools, districts, and the SEA at all levels of the accountability and assistance system through district reviews, district and school improvement plans, school improvement tools, and other forms of technical assistance. The district standards and accountability system date from the late 1990s. In 2008, the SEA undertook a review of the standards in an effort to make them more manageable, coherent, and useful and to update the underlying research. State staff pulled from a variety of sources for this review, including extant research, stakeholder groups, and working groups tasked with developing a new teacher evaluation system (for research-based human resources and professional development indicators) and a framework for supporting children with behavioral health needs (for research-based student support indicators). They asked their Regional Education Lab to identify the research underlying the indicators and their impact on schools. The SEA then compiled this research into a guide and posted it on its website.

We've used research [for the District and School Standards] explicitly because we want to be transparent about it so that it can guide, so that people understand they're being held accountable to things that research tells us are important. But also so that the assistance can be, that we can tie the assistance around some of what research is telling us as well. (State A: 0101)

State B

In State B, the impetus to create a new school-level improvement framework in 2006 was driven by the perceived inability of districts to produce meaningful plans to address Title I schools not making progress. "We were getting nothing. I mean, it was just awful stuff. And then we would go back and we'd say, 'Let's see what you've done?' And they would have done nothing. They may or may not have spent the money" (State B: 1003). SEA staff engaged school improvement specialists and other educators to develop the framework and companion planning documents, and drew upon the literature reviews and information acquired from two other state initiatives on effective schools and student achievement. In contrast to State A, their challenging experience with districts led them to use the research to expand attention and focus on supports targeting school level leaders—principals, assistant principals, and teacher leaders.

By the time of our visit in 2011, State B's framework was widely viewed as the touchstone to which all other strategies and tools should relate; staff perceived the framework to be held in high regard, and therefore not itself a document to be revised even when other aspects of the system were undergoing review. Staff attributed its status to the quality of the research, which has not been changed since the framework was originally published. For example, one SEA official described using the framework to develop an improvement process that schools would engage in with an external provider team:

We made sure we took each of the five strands [of the SI framework]. And if you think of what this big picture is, how can we use the research from these five strands to do that? So that was the whole basis of [our new component of support]. . . . But I think the fact that we based it so solidly on research

in the first place, I think that really helped as we went along that it didn't ever need anything major to change. (State B:1005)

State C

This state similarly found that improvement plans being submitted to them were scattered, were poorly conceived, and lacked a solid theory of action. The CII's *Handbook on Restructuring and Substantial School Improvement* seemed to present a ready solution to this problem. The handbook contains chapters on district and school restructuring with research cited for actionable processes and guidance about what to do or not to do with improvement plans (Hassel et al., 2006). At the end of the handbook is a module with a consolidated checklist of indicators for schools, districts and teachers to use to identify areas for improvement, a research-based guide to action that they found readily usable, and useful.

With the Center tool, there are indicators and . . . the [Handbook on Restructuring and] Substantial School Improvement, that's what we based everything on. I read that book, I loved it and I called and said, "This is what I want in [our state]. I've got to have this kind of support. (State C: 1006)

The SEA, however, took a proactive stance with CII to help them transform these materials into what SEA staff considered to be a more focused and useful format. Working with their own school improvement coaches (who are retired educators), CII staff, and their regional CAC, State C created a more streamlined set of indicators, cutting the number from the *Handbook* by half. They also collaborated with CII to develop a technology-based platform, Indistar, to make the SEA's monitoring process more feasible and affordable as well as intensive.

These examples show that SEA staff gravitated to research that was actionable, was feasible, and addressed the problems that they saw arising from their current policies and practices. These problems and policies, as well as funding, guided where they identified research solutions. As one respondent explained,

When I think about information, or theories, or whatever that are presented in the group . . . [I] think about a Venn diagram. You know, that place in the middle where theory of practice meets practical implementation questions. Where is that place in the middle where . . . what appears to be a good practice in thought, actually works at the ground level or at the school, or at the [district]. (State C: 1017)

Creating Useable Knowledge

The findings of formal research studies rarely offer direct, definitive, and sufficiently specific guidance about how to modify or institute new policy or practice to achieve desired outcomes. And, as noted earlier, the literature on knowledge utilization suggests that integrating contextual, local, and/or practitioner advice with research is critical to developing "useable knowledge." Our three states were no exception to these findings. Survey respondents from across these SEAs indicated that they used data and two sources of practitioner knowledge—their own colleagues and practitioners with similar responsibilities outside their SEA—to inform their work, at least as often or even more frequently than research (see Table 1). They sought out practitioner advice to develop strategies or tools, adjust research-based guidance into their own particular settings,

or use “feedback loops” to modify policies and practices as they were implemented in the state.

For example, SEA school improvement staff in States A and B routinely sought input from educators in their own local districts or regional area education agencies to collaboratively design their tools and other initiatives. State A developed several web-based school improvement tools in collaboration with external intermediaries, a network of urban superintendents, and SEA liaisons with urban school districts. The SEA also created new regional assistance centers to support a broader range of districts in the state, drawing in part on experience from the urban districts and superintendents’ networks. They also engaged the CAC, a local educational consulting group, and practitioners in the design of this system. Involving educators in both the design and the staffing of these regional centers was seen as critical in gaining credibility and in fitting the work to the needs and problems of the field. Each member of a regional team—the regional assistance director, and the math, literacy and data specialists—was also supported by an external partner who provided “new research and ideas” through professional development to each job type.

State B also designed some of its supports for schools in partnerships with local practitioners. For example, they worked with school improvement facilitators from regional area education agencies to design a new process to engage schools in a cycle of improvement. They began with the research-based school improvement framework but brought in the facilitators for their on-the-ground, intimate knowledge of low-performing schools and then solicited input from Elementary and Secondary Education Act program specialists.

In another example, the state hosted a focus group meeting with principals from low-performing schools to get their feedback on the improvement supports. This formative feedback session led the state to give schools and their support partners greater authority to select assistance based on a more context-specific evaluation of their needs and away from a more uniform set of supports based on the period the school was under sanction. Research had informed all of these strategies. But other kinds of evidence, especially, practitioner knowledge and feedback, were important in fine-tuning and translating the research into usable knowledge that addressed the changing problems of changing.

SUMMARY AND CONCLUSION

Our evidence and analysis shows how SEA staff across these three states became active seekers of research and other types of evidence to inform their work and how their searches contributed to conceptual or instrumental use of this knowledge for school improvement (see also Barnes, Weinbaum, & Francis, 2012; Fink & Weinbaum, 2012). At the same time, SEA staffs were cognizant of the limits of research as a guide to action. They recognized that the research base alone could be too limited to support their responses to federal and state mandates, or insufficient to meet emerging problems of implemented improvement practices.

SEA staff relied heavily on their colleagues across a range of offices, a communication and work arrangement that defies traditional images of the SEA as a bureaucracy with isolated units. These and other more lateral interactions seem to have been compelled by a variety of factors, including state and federal accountability programs, efforts to respond to federal grant initiatives such as Race to the Top, the need to work more collaboratively because of staffing shortages, guidance and support for cross-agency teams from facilitating external partners, or internal SEA

management strategies. Better understanding of how these more lateral advice or knowledge network structures emerge and persist, as well as how they relate to more formal hierarchical organizational structures, may help SEA leaders improve the exchange and use of research-based knowledge. As our framing literature suggests, if broader communication patterns develop a more widely shared understanding of the work and the research behind it, they may also help produce a more coherent and integrated set of policies.

Our evidence also shows that external organizations were often critical in supporting SEA staffs' use of research-based knowledge in their school improvement policies or practices. These organizations provided expertise and human capital in areas where SEAs were lacking, and access to ready-made or adaptable tools. They brought in fresh perspectives or confirmed that SEA actions were in step with research or the initiatives of other states. When external organizations were involved in delivering supports to schools or districts, they provided "on-the-ground" perspectives to develop or adapt strategies to emerging problems in specific contexts. Some external organizations intentionally fostered new relationships among staff from different departments within the SEA, or with external experts and practitioners. In many cases, these groups met frequently to discuss the needs and challenges they faced in school improvement, exchange research, or other types of information and to brainstorm new approaches. In short, they created what Wenger and others have called "communities of practice," organizational forms that have been shown to be highly productive (Wenger et al., 2002). Participants in these work groups could develop the kind of shared understanding, mutual trust, and collective motivation needed to facilitate and coordinate action. For SEAs facing a complex array of demands from multiple masters—federal agencies, state legislatures, governors, boards, advocacy groups, local education agencies—this form may be especially useful.

We found that many sources for information were pursued by just a single individual, suggesting that communication around work topics was tied to a very specific task or to the personal connections of a staff member. However, it was also true that a subset of SEA staff and external organizations was sought out by relatively large numbers of people. Internally, these central players were more well connected and influential brokers of information, and they tended to be senior administrators. Through their interactions with outside organizations and across various SEA departments around research and other types of information, they both gained and were able to share expertise and a broader perspective on school improvement. And because many people turned to them for research advice, they had the potential to develop a common understanding of improvement strategies across the agency.

An important implication of our study is that agency leaders and school improvement policy-makers would be wise to understand not only who the influential actors are within an SEA but also how to develop more of them. Doing so would help keep the SEA innovative and up-to-date on rapidly changing research findings and help integrate other kinds of knowledge and expertise to make the research more useful and adapted to their own settings. SEAs with a very limited number of influential knowledge brokers could be vulnerable if these staff members exit the organization; in those instances, their leaving would damage the agencies' ability to sustain the knowledge needed for key work. Similarly, it may also be useful to identify members who are not currently participating in the networks, or who have the only connection to a source of knowledge. Engaging isolated or weakly connected individuals could tap extant sources of expertise with the potential to generate valuable innovations in school improvement programs or policy design.

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State Education Governance and Policy: Dynamic Challenges, Diverse Approaches, and New Frontiers

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State governments are crucial actors in the nation's system of education governance. This issue of the *Peabody Journal of Education* underscores the wide-ranging roles that state governments play in the oversight, development, and implementation of elementary and secondary education policy in the United States. In this article, I consider these individual analyses by reflecting on the broader themes and patterns that they suggest. I argue that at the dawn of the 21st century, the 50 U.S. states face dynamic challenges that are testing their institutions of governance. States are also simultaneously crossing new frontiers that will influence future policy and opportunities for the nation's students.

INTRODUCTION

The eclectic set of topics addressed in this issue of the *Peabody Journal of Education* underscores the wide-ranging roles that state governments play in the development and implementation of elementary and secondary education policy in the United States. Ultimately, local factors in districts, schools, and classrooms are hugely important in determining how policies operate in practice (Lipsky, 1980; Wilson, 1989). Despite the enduring influence of local control, the states themselves still create the policy frameworks, regulatory guidance, and measurement instruments that delimit or define acceptable ranges of local action. And although the federal government's role in education has intensified, readers should not believe the frequent headlines and breathless op-eds that lament the supposed federal takeover of the nation's schools via the No Child Left Behind Act (NCLB). If anything, the nation's decade of experience with NCLB and the Obama administration's subsequent efforts with Race to the Top (RTTT) have magnified rather than diminished the significance of state governments, as almost all federal education programs are administered by leaders in state capitals. Those federal programs operate alongside the states' own efforts to cajole, measure, rate, influence, and assist the nation's 14,000 school districts and 100,000 schools.

A valuable tool for understanding the states' overall position in the nation's complex system of education is Meier and O'Toole's (2006) general model of governance, which views policy outputs and outcomes emerging from the intersection of three things. First are institutional

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arrangements, namely, the formal structures that define bureaucratic roles in government agencies, lines of authority or cooperation between those agencies and their nongovernmental partners, and concrete policies and regulations. Second is the behavior of public managers working within and across those institutions; these managers may seek to defend prevailing approaches or attempt to deviate from them to advance change. Third are environmental factors comprised of numerous social, political, and economic forces that constrain or enable public managers charged with producing valuable policy outputs and outcomes.

Meier and O'Toole's (2006) model and analyses from other scholars emphasize that although inertial forces can constrain new initiatives, these structures and managers operate in potentially fast-moving and unpredictable worlds where prevailing solutions or assumptions can have relatively brief lifespans (Baumgartner & Jones, 1993; Moore, 1995). That is true in education and other policy areas. At the dawn of the 21st century, the 50 U.S. states are facing dynamic challenges that are testing their institutions of governance. At the same time, states are simultaneously crossing new frontiers that will influence future policy and opportunities for the nation's students.

DYNAMIC CHALLENGES

Ask veteran teachers, school district superintendents, or state agency managers and they likely will agree that today their work is more difficult than when they entered the field of education. The environmental forces that Meier and O'Toole (2006) described have produced social and economic concerns that have placed ever-increasing demands on state education policymakers. Although it is possible to identify several specific reasons for these changes, they tend to flow from three main sources.

Ensuring Academic Excellence and Equity

First is the nation's increasing concern about student achievement and the gaps in achievement between student groups. The notions of promoting "excellence" and "equity" are often used to describe these different yet interrelated challenges. A decade of intense focus on standardized testing and measurement—along with international comparisons of student achievement—has prompted a sense of urgency about academic performance. Many American students' absolute levels of educational achievement and attainment remain lower than needed given the demands of life in a modern democracy and a globally competitive economy. For example, employment data from the years of the recent Great Recession show that individuals with higher levels of educational attainment had more employment opportunities than those who possessed only a high school diploma or less (Bureau of Labor Statistics, 2012).

Those concerns about excellence and high achievement reside alongside the even more persistent challenge of ensuring that success in school is unrelated to the social or economic characteristics of a student's home. In the United States today, children from families that earn relatively low incomes, or children who are members of racial, ethnic, or language minorities (who collectively tend to be low-income) continue to achieve at lower levels than their more advantaged, white, and native-English-speaking peers. International data reveal the depth and breadth of this problem, as achievement tends to be highly correlated with family income across most nations (Ladd, 2012).

Such differences have motivated advocacy groups in the United States, such as the Education Trust, the Center for American Progress, the National Council of La Raza, and the Black Alliance for Educational Options, to propose diverse policy reforms designed to increase resources and educational opportunities for the nation's most disadvantaged students. Harrison and Cohen-Vogel's (2012/this issue) analysis of teacher reform illustrates examples of this advocacy in Florida.

This issue of the *Peabody Journal of Education* is important because it shows how the struggle to improve educational excellence and equity varies across the states. Results from the 2009 round of National Assessment of Educational Progress (NAEP) testing reveal a couple of reasons why. Figure 1 plots average scale scores of each state for NAEP tests in reading and math in that year. The figure shows that some states do much better on average than others, suggesting that meeting the challenge of increasing student achievement, and attaining excellence, differs across the states. Notably, scores on both subjects have a strong positive correlation within each grade level. For example, the top part of Figure 1 shows that Massachusetts outpaces all states in fourth-grade math (scale score 252.3) and fourth-grade reading (scale score = 233.7), whereas other states such as Mississippi, Arizona, and California lag far behind in those subjects.

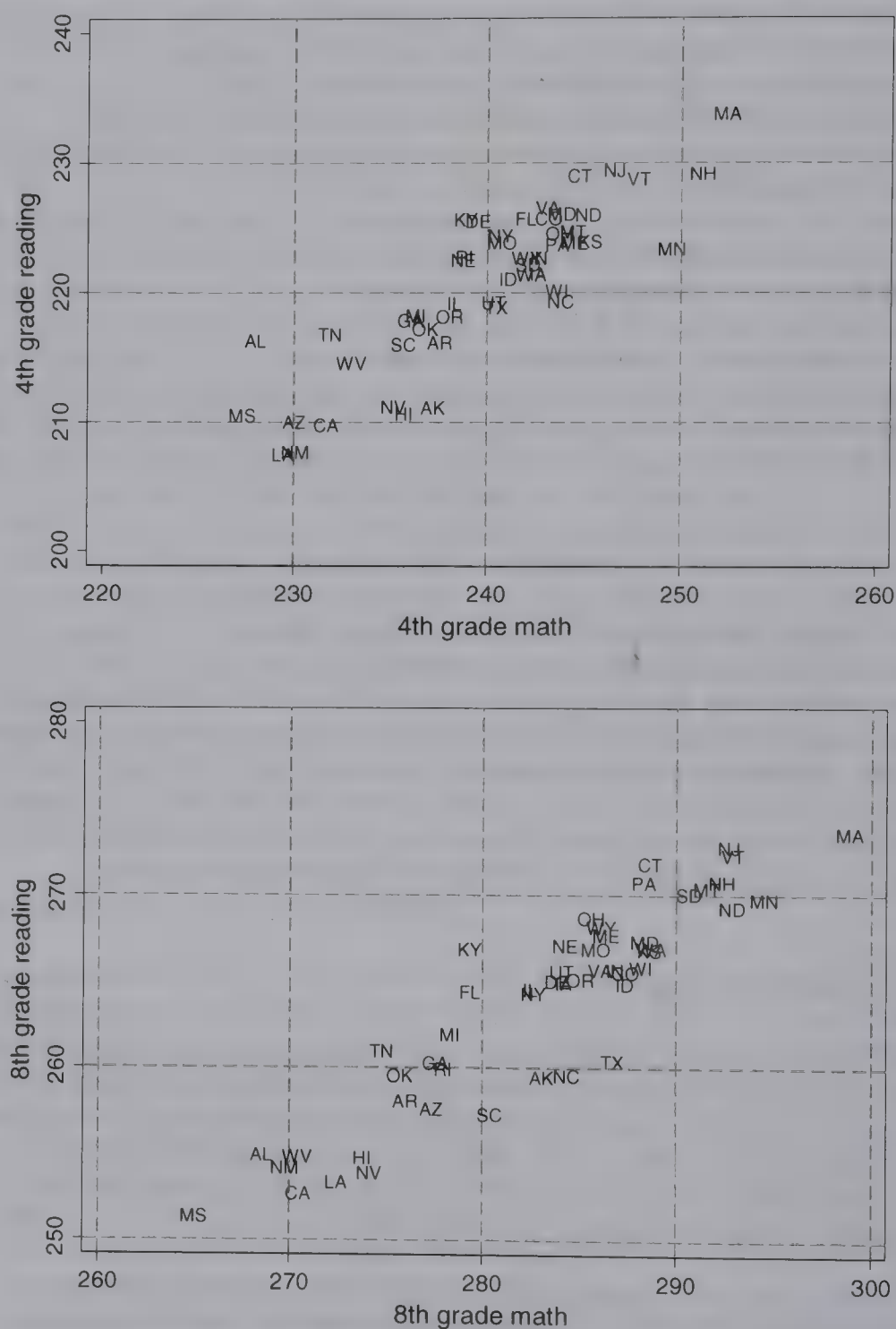
Similarly, as Figure 2 illustrates, the equity problem, reported here as achievement gaps between students receiving free or reduced cost school meals (e.g., from poor families) and their peers (e.g., not from poor families), also varies by state. Considering the fourth-grade results in the top of Figure 2, Indiana, North Dakota, and Wyoming have some of the lowest gaps among the states, whereas California, Connecticut, and Illinois have some of the highest. Taken together, Figures 1 and 2 show that any effort to address equity and excellence should recognize that some states face steeper challenges than others. Although every state could do better, some require much more effort, smart investment, and assistance to improve current conditions. Further, the results underscore the importance of examining overall achievement but also disaggregating scores to examine gaps between student groups. Connecticut, for example, is a relatively high performer in Figure 1, but notice in Figure 2 that its achievement gaps are relatively large.

Teaching Diverse Students

A second dynamic challenge facing the states is the growing diversity of the nation's students. An obvious source of these changes has been the expansion of immigrant populations in the United States, something that the nation's urban areas and states such as California, Florida, Illinois, and New York have experienced for decades. Now, other states and local communities have seen their immigrant populations, comprised primarily of Spanish-speaking students with family origins in Latin America, dramatically expand. As the Pew Hispanic Center notes,

from North Carolina on the Atlantic seaboard to Arkansas across the Mississippi River and south to Alabama on the Gulf of Mexico, sizeable Hispanic populations have emerged suddenly in communities where Latinos were a sparse presence just a decade or two ago. (Kochhar, Suro, & Tafoya, 2005, p. i)

The report notes that Mecklenburg County in North Carolina, for example, had fewer than 7,000 Hispanics in 1990, but by 2000 that number had reached 45,000; estimates from the 2010 census put the number at roughly 117,000 (U.S. Census Bureau, 2012).



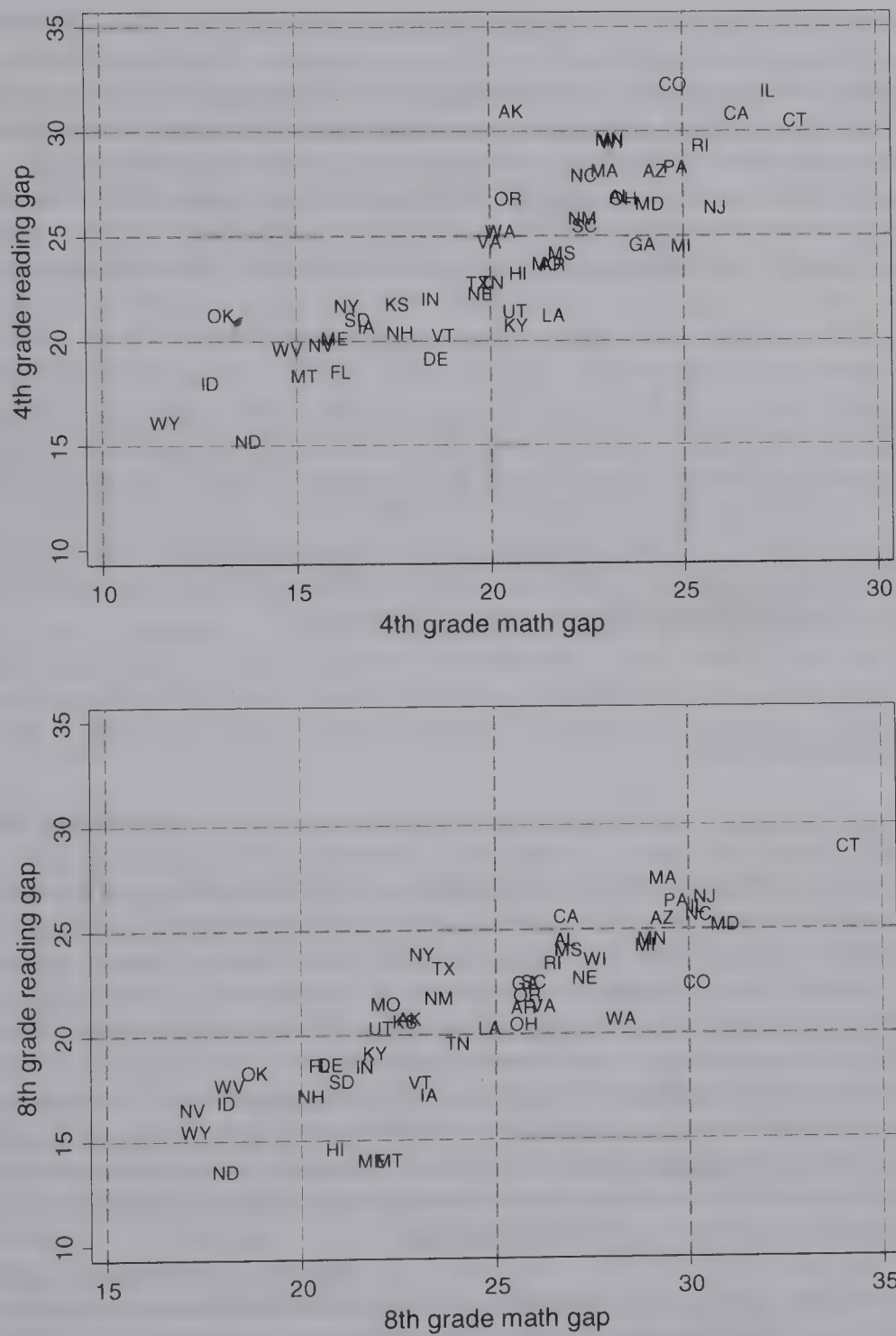


FIGURE 2 Achievement gaps by student income in state scale scores for fourth- and eighth-grade National Assessment of Educational Progress reading and math, 2009. *Note.* Larger numbers indicate greater achievement advantages for students ineligible for free and reduced-cost meals (e.g., not poor) over students who are eligible for these meals (e.g., poor). The bottom panel of the figure, for example, shows that nonpoor students in Connecticut (abbreviated “CT”) have a 34.1 point achievement advantage in eighth-grade math (horizontal axis) and a 28.9 point achievement advantage in eighth-grade reading (vertical axis). *Source:* Author’s analysis of data from the National Center for Education Statistics (2012b).

Those demographic trends have continued and likely will persist into the future. Recent census data from 2011 show that for the first time in history the number of children of color exceeded the number of white children among children younger than 1 year of age (Paulson, 2012). Considered alongside the prior challenge of improving academic achievement, these demographic facts are important because they show rapid growth in student populations that tend to be furthest behind academically, tend to come from economically disadvantaged backgrounds, and tend to lack access to the best schools and teachers. The country's demographic future suggests that achieving the nation's equity and excellence goals will become more rather than less difficult.

In addition to growing ethnic and language diversity, states and school districts also are educating more students with a diverse range of disabilities. The growth of students in this category has resulted in part from an expanded set of disability categories as defined in federal policy (Finn, Rotherham, & Hokanson, 2001). An additional issue is the lack of early screening for disabilities, which are easier to identify in younger children. As students age, the latest technologies and assessments have more trouble determining whether these students actually have a disability or simply lack basic reading and math skills (Finn et al., 2001). Misidentification has important consequences because it prevents students from receiving an appropriate educational program. Further, when students receive unnecessary but expensive special education services, states and districts end up wasting scarce financial resources.

Managing Financial Stress

Although concerns about achievement and teaching diverse student populations have steadily grown since the 1970s, the nation's current fiscal situation represents a third more recent challenge. The Great Recession has crunched school budgets and foreshadows a future of increasingly tight fiscal conditions. Popular metaphors capture the sense of concern that exists. From predictions of falling off a "funding cliff" to enduring a coming "fiscal tsunami," schools are entering a new era marked by fiscal pressures likely to worsen (Hess & Osberg, 2010). Even after the Great Recession subsides, education will have to compete with expanding health care costs and other demands from politically active elderly populations who are skilled at protecting their favored programs. The absorption of education policy debates into more general-purpose state government venues—versus more special purpose entities like state boards of education—and led by governors and legislators who have become increasingly interested in education is one reason why advocates for greater education funding must engage with these other competing state priorities (Henig, 2009; Shober, 2012/*this issue*).

States have coped with the fiscal "new normal" in different ways. Retrenchment has been common as states and local school districts have eliminated or cut back programs (Hess & Osberg, 2010; Rentner & Kober, 2012). Despite those efforts, state leaders have also used the current climate to justify launching new initiatives, often to cut costs or find new efficiencies. Natale and Cook's (2012/*this issue*) analysis of virtual schooling nicely captures this dynamic. Online or blended learning seems to have received as much support for its fiscal benefits as for its educational ones. Shober (2012/*this issue*) shows how state politicians have used budget debates to push more fundamental changes rather than simply programmatic ones. In Wisconsin, for example, he notes that the state's budget situation gave Governor Scott Walker "rhetorical

cover to fundamentally overhaul decades of tense relations between school boards and teachers' unions" (p. 571).

Such efforts will not surprise scholars of agenda setting. These researchers have commonly noted that crises can create "policy punctuations" (Baumgartner & Jones, 1993) or "windows of opportunity" (Kingdon, 1995) that savvy politicians often leverage to advance bold and often controversial policy ideas or to remake the political landscape. In contrast to the Mazzoni model, which Finch (2012/*this issue*) cites in her analysis of RTTT in Tennessee, these other examples show that new revenue can be helpful but is not a necessary condition for policy change.

DIVERSE APPROACHES

An important but oft-forgotten fact in discussions about education is that the states are structurally quite diverse in how they are organized to develop and implement education policy. On the surface most states look remarkably similar, as they fund education from state and local coffers (along with federal supplements) and possess common organizational entities such as school boards and state education agencies. Yet important differences emerge when one studies the bases of institutional authority, the connections between institutions within a state, and the balance between state and local power—important features of the governance system that Meier and O'Toole (2006) described. These systems lead states to produce sometimes very different policies and regulatory interpretations as they carry out their own policies and those of the federal government (Junge & Krvaric, 2011; Manna & Harwood, 2011; Manna & McGuinn, *in press*; Shober, 2010).

State Governance

Probing the array of state-level entities that govern education reveals some of the institutional diversity that exists. Figure 3 summarizes the major actors that govern and oversee elementary and secondary education. The two key entities here are state boards of education (Minnesota and Wisconsin are the only two states without them) and state education chiefs (in all 50 states), sometimes called state superintendents of public instruction. The former play policymaking and oversight roles, akin to local school boards, whereas the latter, who run state education agencies, write regulations and guidance and attend to the daily implementation of state and federal policy. Chiefs and boards are the major, rather than the sole, actors, as some states also possess other diverse agencies or boards that oversee particular areas of K-12 schooling (Campbell & Mazzoni, 1976). These include institutions overseeing vocational education or teacher licensing, and even virtual education, as Natale and Cook (2012/*this issue*) explain in describing the governance of the Florida Virtual School.

Two facts about Figure 3 highlight the diversity of state approaches. First, state governors wield varying amounts of power over the makeup of state boards and the leadership of state education agencies. Nine states allow governors to choose both board members and chiefs, whereas six cut governors out of this process and instead allow voters to pick board members who then select the chief. Second, although 39 states use one of the four models presented in Figure 3, the figure's note explains that 11 states embrace some different combinations as well. In New York, for example, the state legislature appoints the board and then the board names the chief, whereas in South Carolina, which also has a board appointed by the legislature, voters elect the chief.

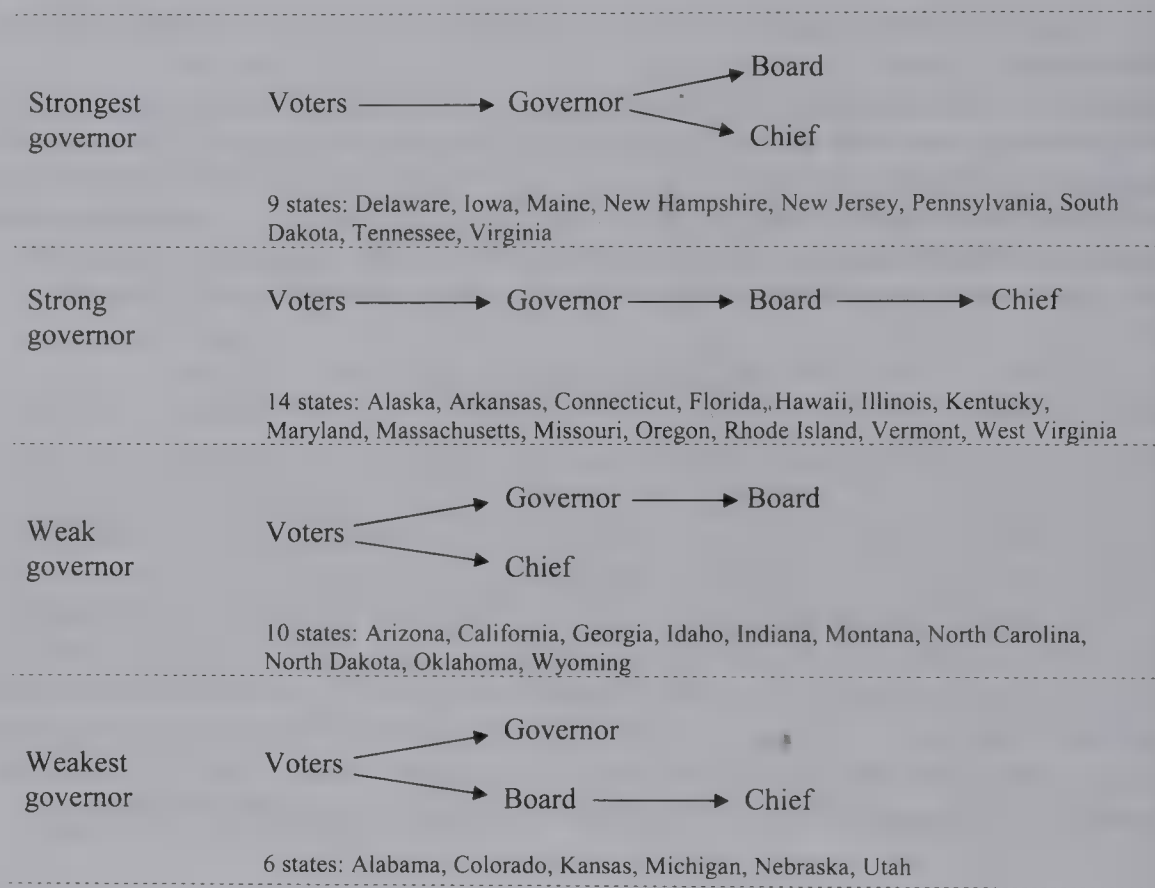


FIGURE 3 Models of state education governance, 2012. *Note.* These 11 states have other arrangements: Louisiana, Minnesota, Mississippi, Nevada, New Mexico, New York, Ohio, South Carolina, Texas, Washington, and Wisconsin. “Board” refers to the state board of education and “chief” refers to the head of the state education bureaucracy, often called the chief state school officer. *Source:* Adapted from National Association of State Boards of Education (2012).

These diverse approaches sometimes frustrate governors who wish to act swiftly and aggressively to alter state policies and priorities. Shober (2012/*this issue*) provides a concise yet thorough analysis of the transition to this state of affairs, as governors once took a very hands-off approach to education, until becoming more active and engaged following the 1970s. Among other things, the Charlottesville education summit in 1989, a meeting of all governors and President George H. W. Bush, helped governors increase their power and establish themselves as more vocal spokespeople on elementary and secondary schooling (Manna, 2006). Being more publically visible and more likely to hear concerns or receive blame for poor school performance, governors have sought to obtain greater policy control from previously more insulated state boards and chiefs. In the process, the governors have accelerated the absorption of education policymaking and oversight into more general-purpose institutions of state government (Henig, 2009). The fragmented state-level governance that exists in the United States contrasts sharply with provincial-level governance in Canada. As Wallner (2012/*this issue*) describes, provincial ministers of education wield near-absolute authority with little or no interference from national leaders in Ottawa and few mechanisms for local resistance.

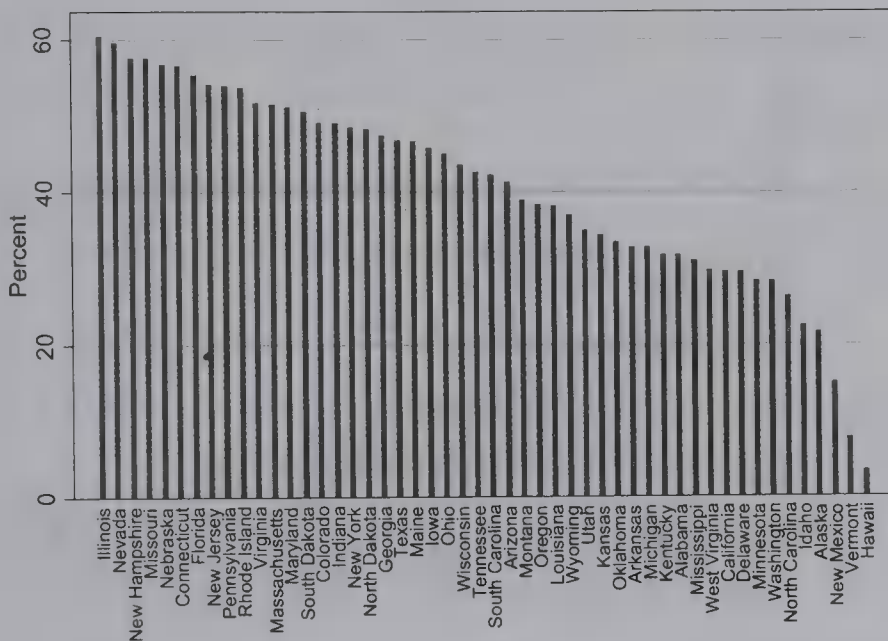


FIGURE 4 Percentage of K-12 education revenues from local sources, 2008–09 school year. *Source:* Author's analysis of data from the National Center for Education Statistics (2012a).

Commitments to Localism

An additional way to consider institutional diversity and lines of authority (Meier & O'Toole 2006) is to recognize the states' varying commitment to localism. Shober (2012/*this issue*, p. 561) notes the differences when he describes the relatively centralized approach in Florida, which “contributed to Governor Jeb Bush’s ability to fast-track his favored education policies,” compared to the more decentralized systems in Ohio and Wisconsin. Data from all 50 states help reveal these cross-state differences.

Consider Figure 4, which describes the amount of revenues for K-12 education that come from local sources in 2008–09. The totals by state range from a high of 60.5 and 59.6% in Illinois and Nevada, respectively, to a low of 7.8 and 3.4% in Vermont and Hawaii. A look back in time illustrates how these patterns have changed. Even though funding differences still exist across the states, as Figure 4 shows, the amount and variability of local funding has declined. This is due to state court decisions and legislative policy changes that have attempted to equalize funding by decreasing local power. In 1978–79, for example, on average across the states 44.1% of K-12 education revenues came from local sources with a standard deviation, a measure of how deviant states tended to be from that average, of 16.9%. Thirty years later, in 2008–09, the average had declined to 40.5% and the standard deviation from that average stood at 13.3%.

One can see additional institutional variation by studying the number of local school districts that exist in each state. Figure 5 plots these data from 2008–09. They show a few states at the top—Texas, California, and Illinois, with 1,032, 960, and 869, respectively—followed by a downward progression that eventually ends with Delaware, Nevada, and Hawaii, at 19, 17, and one each. One interesting result is that the number of districts is imperfectly correlated with state population. Some relatively smaller states (e.g., Iowa and Kansas) are in the top half of the figure,

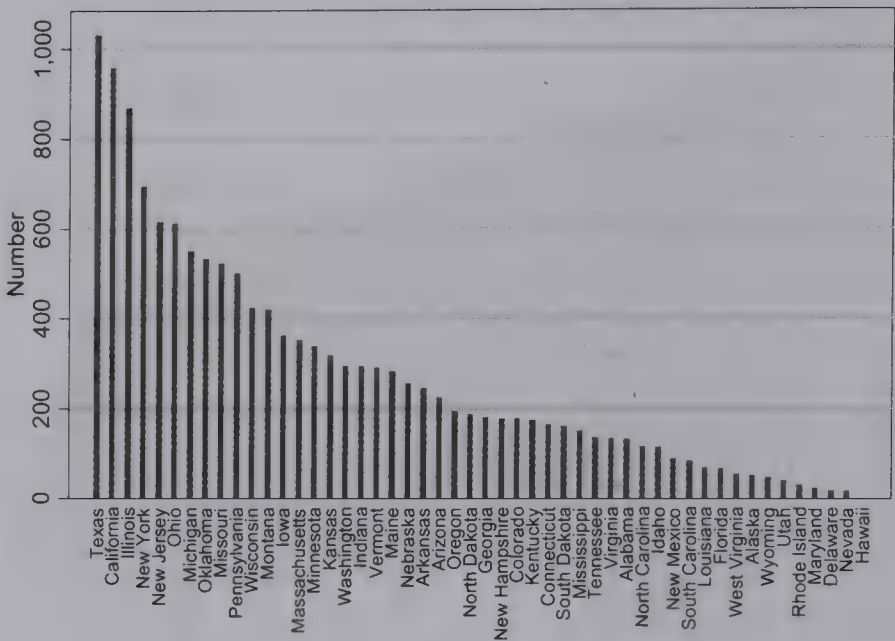


FIGURE 5 Count of local school districts, 2008–09 school year. *Note.* The count for each state includes traditional school districts and individual district components of supervisory unions. A supervisory union exists where several individual school districts share a superintendent and administrative services. *Source:* Author’s analysis of data from the National Center for Education Statistics (2012a).

whereas other somewhat larger states (e.g., Florida and North Carolina) are near the bottom. Finally, unlike the data on local funding, these numbers have remained relatively stable in nearly all states since at least the mid-1970s. Many more school districts existed in the first half of the 20th century; district consolidations dramatically shrunk those numbers by the 1950s and 1960s (Berry & West, 2010).

Other work has shown that differences in funding sources and the number of school districts are related to a state’s willingness to impose certain curricular requirements on local school districts. Manna and Harwood (2011) found, for example, that states providing more funding for elementary and secondary education are more likely to require additional science credits for high school graduation. That same study also found a negative correlation between the number of school districts in a state and the number of science credits required. State systems that are more locally oriented do appear to produce different policies, at least in some important areas. The contrast with Canada, which Wallner (2012/this issue) provides, again is instructive, given that the provinces dominate funding allocations and tend to wield much power over local curricular policies.

Federalism’s Middle Managers

A final source of variation across the states is how they interpret and carry out their role as key middle managers in the nation’s federal system. Finch (2012/this issue) nicely summarizes this fact in noting that “the state’s role in education policymaking is unique: It serves as a balance

between broad federal goals and the needs of specific local contexts” (p. 591). Although harder to quantify, this role has become increasingly important since the 1980s especially, because before that time the main task of state education agencies was to distribute federal and state funds to districts and then to audit local actions to ensure that local communities spent those dollars legally. Today, these same funding and audit functions remain, but now state agencies pursue numerous additional substantive tasks focusing on developing and managing statewide testing systems, incorporating student achievement data into teacher evaluation procedures, and designing and supporting strategies for school improvement (Massell & Goertz, 2012/*this issue*; Natale & Cook, 2012/*this issue*).

The increasing role of governors as educational leaders, noted earlier, was one factor that created these new responsibilities, and a more assertive federal role in education has been another. As Massell and Goertz (2012/*this issue*) argue, one reason why state education agency officials have become increasingly interested in education research is that they have been charged with addressing complex challenges, such as helping improve the most struggling schools. Policies such as NCLB and RTTT have provided leaders of state agencies with new opportunities to reconsider their organizational structures and critical tasks as they confront the academic, diversity, and fiscal challenges noted earlier.

The concept of middle management is useful given the important role that public managers play in Meier and O’Toole’s (2006) model of governance. In general, those authors and others (Moore, 1995; Wilson, 1989) have described how public managers, which include agency leaders or officials running specific programs or subsets of larger ones, must make important choices as they confront the environmental factors that complicate their work. One management approach, labeled “M₃” by Meier and O’Toole (2006), is to leverage these challenges to change core assumptions, policy priorities, and agency strategy. These leaders see complex environments as sources of strength and opportunity. In contrast, the authors explain how “M₄” public managers cautiously assess these same environmental conditions and attempt to buffer their agency against outside pressures to maintain current agency priorities. Such managers may choose a more cautious route for many reasons including their own personal fears or their assessment that their agencies possess limited capacity to act creatively. Whatever the reason, politicians and policy advocates often criticize these more risk-averse managers who they consider out of touch and resistant to trying creative new approaches to confront the ever-increasing challenges of the day.

States vary in the mix of M₃ and M₄ managers that they employ and those differences produce substantive consequences. As Junge and Krvaric (2011) showed, state officials’ willingness to embrace flexibility in law (characteristic of the M₃ approach) versus reading the law more narrowly (an M₄ interpretation) leads states to develop different policies and regulations that guide school district behavior. The middle-management role of states, and the mix of these managerial types, is hugely important for the carrying out of federal policy. Junge and Krvaric (2011) stressed that the federal government does not really implement education policies such as NCLB or RTTT; rather, the states do. In short, federal policies operate as state-administered programs and that administration, guided by different combinations of M₃ and M₄ thinking across the states, can translate into very different opportunities or demands in local school districts (Manna, 2011).

One illustrative example that Junge and Krvaric (2011) raised is the implementation of school-wide Title I programs. This is an option that federal policymakers designed in NCLB (and prior versions of the Elementary and Secondary Education Act) to let schools with many disadvantaged students use federal aid to support school programs that benefit all students in a school. That is

supposed to downplay fears that federal regulators will penalize schools or districts for using Title I money to benefit students ineligible for Title I services. Although federal laws and regulations have allowed this flexible use of Title I dollars in certain schools, some state education agency interpretations of the law have restricted local districts that may wish to take advantage of this flexibility. Fearing program audits, cautious middle managers at the state level have limited local actions that may seem perfectly consistent with the intent and letter of federal policy. Although in other states, more expansive interpretations of the law provide local districts with much freedom to try a diverse array of schoolwide models.

NEW FRONTIERS

The challenges confronting state education leaders will likely grow rather than shrink in the coming years. The dynamic forces in the environment already discussed—involving concerns about academic excellence and equity, student populations becoming increasingly diverse, and fiscal stresses—represent fairly predictable, albeit challenging, conditions for state officials to manage. Other aspects of the future seem less certain yet have the potential to remake in important ways the nation's education landscape. Three of these new frontiers involve technology, nascent but expanding interstate efforts, and the continued evolution of education politics.

Technological Change

Technological advancements are chafing against the institutional and policy arrangements that govern education in the states. Some authors have predicted that technology will prompt a revolution in everything from how the country oversees its schools, to the opportunities available to students, to the very definition of "school" itself (Moe & Chubb, 2009; Peterson, 2010). Although one would be foolish to ignore those potential impacts, readers should remember that reform enthusiasts for decades have predicted similar changes during prior administrative or technological revolutions—the Progressive Era and the advent of radio and television, for example—that nevertheless failed to fundamentally change the egg-crate model of education in which 20 to 30 students learn from a single teacher in a self-contained classroom (Tyack & Cuban, 1995). Especially when budgets are tight, state and local education officials must carefully scrutinize promises from the burgeoning educational technology sector about the potential advantages of the latest gadget or tool promised to improve student learning. Without careful thinking among state and local procurement officers and curriculum development experts, the future may bring escalating hardware, software, or tech support bills yet little academic progress for students.

As the articles in this issue note, technological change is already prompting new questions and expanding opportunities in the states. As Natale and Cook (2012/*this issue*) show, state education agencies and state policies have struggled to keep up with the rapidly developing phenomenon of online education. Virtual schooling raises several policy and governance issues for states such as defining the virtual school population for purposes of allocating state funding; certifying virtual teachers (Need they be citizens of the state? Could they be foreign nationals who reside overseas?); maintaining academic honesty and integrity of virtual learning models so that the inevitable cheating or other scandals that occasionally emerge do not sink the entire enterprise; and, last, helping parents understand the comparative quality of virtual schools, just

as current accountability systems try to assign marks to traditional brick-and-mortar institutions. These are incredibly challenging and important issues in state leaders' hands, and they become potentially even more complicated when virtual models are proposed as charter schools. In some states, charter school policy remains in a relatively immature form, even though that model of schooling has existed in some places since the early 1990s. Policies and oversight mechanisms that may seem appropriate for traditional public schools or charter schools may be infeasible in virtual settings yet relatively understaffed state education agencies nevertheless must address these emerging issues (Massell & Goertz, 2012/*this issue*; Natale & Cook, 2012/*this issue*).

Amidst the thorny set of governance and policy issues that technology is raising for state leaders, Massell and Goertz's (2012/*this issue*) analysis also reveals an often overlooked, yet important, bright side that illustrates how technology can facilitate rather than complicate the work of state education agency officials. The growing interest in education policy research, including rigorous study of different teaching methods and academic programs—conducted by neutral third parties rather than program vendors themselves, it is important to note—has produced a rapidly expanding literature of studies and data sources that state education officials can easily access online. As rigorous research on the effects of education policies and interventions becomes more plentiful and available, state agency officials interested in using this research stand poised to benefit greatly as they conduct their work.

Interstate Efforts

Another new frontier is the emerging interstate cooperation in major areas such as the development of academic standards and assessments. For example, the Common Core State Standards Initiative (Common Core) has the potential to force major changes in how individual states make policy and govern their schools. Conceptually, Common Core is what Meier and O'Toole (2006) called a networked arrangement in which institutions with independent bases of power voluntarily join forces to work toward a common end. In this case, network members include governors and chief state school officers with additional support from Achieve, a nonprofit organization. Of importance, in policy networks a member cannot compel any other member to do anything, and members can—and have in the case of Common Core—walk away at any time. Networked institutional forms create new possibilities and new governance challenges (Manna, 2010). Unlike hierarchies, which have more clearly defined chains of command, networks raise questions like, What criteria define who can join the network? What obligations do network members assume when they join? Who has control over the products that the network produces? What financial resources exist to sustain the network's activities? Wallner's (2012/*this issue*) analysis of cross-provincial efforts in Canada, most notably through the network known as the Council of Ministers of Education Canada, suggests some useful lessons that enthusiasts of interstate governance and policymaking in the United States should consider.

These questions are relevant for Common Core's future, and easy answers remain elusive. Take the matter of obligations, for example. States that wish to remain part of the network have promised to adopt the Common Core math and reading standards with minimal adjustments. Given the complicated web of education governance within each state discussed earlier, doing so will require state-level entities such as legislatures and state boards of education—not founding

members of the Common Core network—to agree to uphold requirements that have originated beyond the state without their formal input. In addition, regarding finance, supporters of Common Core have been concerned that too much federal money or involvement could raise concerns that it will become a vehicle for adopting “federal” rather than “national” education standards. Already, the awarding of points to RTTT competitors that had adopted Common Core has stoked those fears. If federal dollars run the risk of tainting Common Core, then it would be up to states themselves to sustain the effort financially, something that may be difficult in the current and likely future fiscal climate. The governance and funding questions become even more acute when one turns from the development of common standards to the development and use of common assessments, as states have different policies for test security, how and when students are tested, and when test items are released to the public.

Contested Politics

Finally, the arenas that govern education have seen new political power centers emerge during the last few decades that are challenging traditionally dominant coalitions and long-standing policy commitments and assumptions. Today, an energized array of business leaders, nonprofit organizations, civil rights groups, private foundations, and educational entrepreneurs participate in vigorous political debates alongside traditional sources of organizational power, such as teacher unions and schools of education (McGuinn, 2012). Notably, members of the coalitions forming around different education issues often fail to reside along the traditional “left versus right” or “blue versus red” dimensions that orient much of the nation’s punditry and political talk. In education, advocates for urban minorities and free market enthusiasts may team up to push for greater school choice. Similarly, teacher unions and social conservatives sometimes find themselves on the same side in arguing for greater local (rather than state or federal) control of school curriculum.

The authors contributing to this issue of the *Peabody Journal of Education* recognize the increasingly important impact of an energized, contested politics of education. For example, Finch (2012/this issue) underscores the important role of homegrown foundations in the states, notably the Tennessee State Collaborative on Reforming Education founded by former U.S. Senator Bill Frist. Despite the sheer number of these state-level groups, they often operate out of the spotlight, which is captured by other organizations with larger national profiles such as the Gates Foundation, the Broad Foundation, or the Bradley Foundation. Harrison and Cohen-Vogel (2012/this issue) tell a similar story in Florida about how former governor Jeb Bush’s foundation promoted policy changes in that state. Finally, Natale and Cook (2012/this issue) show how the rapidly growing virtual education sector appears to possess strong allies in state houses and governors’ offices across the nation.

Despite these gains from nontraditional groups, long-standing centers of political power are likely to remain influential. Whereas recently the collective power of teachers and their unions has eroded, Shober (2012/this issue) nevertheless recognizes that teachers are still a powerful political force given that they “are the largest sector of government employees in every state” (p. 572). Further, even as groups such as Chiefs for Change, a coalition of reform-minded chief state school officers, and other nontraditional state education leaders have emerged, Massell and Goertz (2012/this issue) show that line managers and staff in state education agencies still seek much

information from professional membership associations and institutions of higher education, which includes schools of education and other groups that are more traditional participants in education policy debates.

Nationally, the country's politics have become ever more divisive (McCarty, Poole, & Rosenthal, 2006; Poole, 2012). In education, those dynamics have become more visible in states, too, with Wisconsin's recent standoff and recall election pitting the state's teacher unions against Republican governor Scott Walker being a notable example. Certainly, the country benefits when debates about its educational future are energized, passionate, and public. The founders of the United States recognized the value of an engaged citizenry on matters of such high importance. Yet given that the nation's education challenges loom large and require serious attention, all groups engaged in the fray of state education politics should remember that easily identifiable silver-bullet solutions to these persistent challenges do not exist. A broader recognition of that fact in state political debates could help steer them in more productive directions.

CONCLUSION

This issue of the *Peabody Journal of Education* provides a powerful reminder that the states remain pivotal institutions in the nation's system of education governance. Although local school districts and teachers themselves wield the most power to influence students' daily experiences, state government actions are most consequential for producing the policies that influence those classrooms. State constitutions define such a role for states, and further, states become even more, not less, important when the federal government passes new initiatives, as major federal policies are administered by officials in state education agencies. It is important to note that the states vary in their governance arrangements and policy priorities. Future discussions about the states' role should recognize these somewhat conflicting notions. The states share a common set of responsibilities for improving education, yet how they tend to those duties will continue to involve a diverse mix of governing arrangements and policies.

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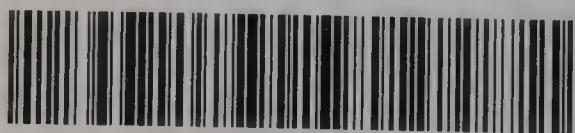
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